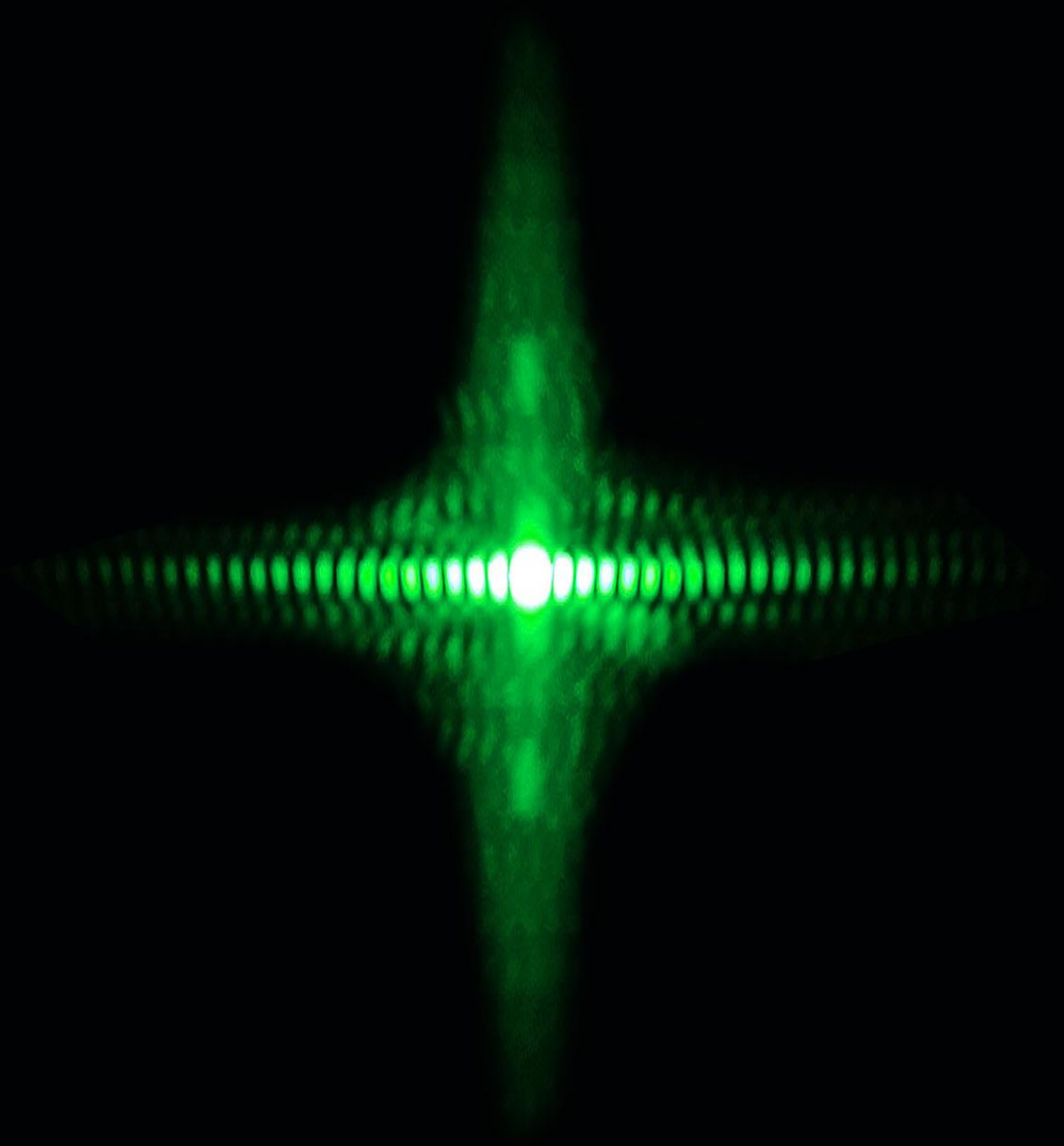
An Explanation of the Double Slit Experiment



Catchments & Creeks

Version 3, 2025

An Explanation of the Double Slit Experiment

Version 3, August 2025

Written and illustrated by: Grant Witheridge, *Catchments and Creeks*, Queensland, Australia.

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Cover: Projected image of a double slit experiment using red light.

Important Note:

The following discussion is a hypothesis. My contribution to this discussion is based on my knowledge of fluid mechanics and wave theory. Readers should not treat the following discussion on **astrophysics** as being statements of fact, but instead an alternative explanation of 'light' based on light moving as a fluid.

About the author

Grant Witheridge is a retired civil engineer with both Bachelor and Masters degrees from the University of New South Wales. He has over 40 years experience in the fields of hydraulics, stormwater management, creek engineering, and as a lecturer in coastal engineering.

Grant brings to this discussion an understanding of fluid mechanics, and his belief that:

- the mechanics of the Universe must be founded on just a few simple principles
- all forces originate from quantum forces, which are the building blocks of energy
- mystery and complexity exists only in the absence of knowledge.

Foreword

Our knowledge of physics should prevent us from needing to believe in magic. However, there are aspects of quantum mechanics and our current understanding of light that appear to invite magic into our physics. If we normalise the idea that magic can play a role in explaining physics, then we will lose our incentive to look for the real answers.

I have not prepared this paper based on my knowledge of astrophysics. In fact, I would suggest that most of the people reading this paper will know more about astrophysics than I do (they would likely know more about good grammar, as well). Instead, it is my knowledge of fluid mechanics and wave mechanics that forms the basis of this paper.

There is no doubting that Einstein helped the sciences take a big step forward, but in some cases that step may have landed us in the wrong place. For example, Einstein admitted to being wrong about his idea of a non-expanding universe. Upon reviewing Einstein's work, I have noticed one more possible error, an error he made that relates directly to my interest in fluid and wave mechanics.

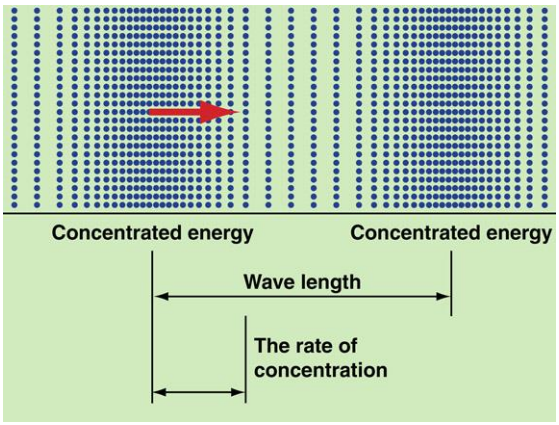
I believe fluid mechanics can help to explain certain outcomes of the Double Slit Experiment that remain poorly unexplained. However, in order to present this explanation, I need to outline what I believe are the true properties of 'light'.

Light is not weird, magical or non-Newtonian. Current theories have made light appear to be far more complicated than it really is. Light is not complex to understand. In fact, light is no more complex than sound waves, with which it shares many properties. Light should simply be 'viewed' as the sound waves of space.

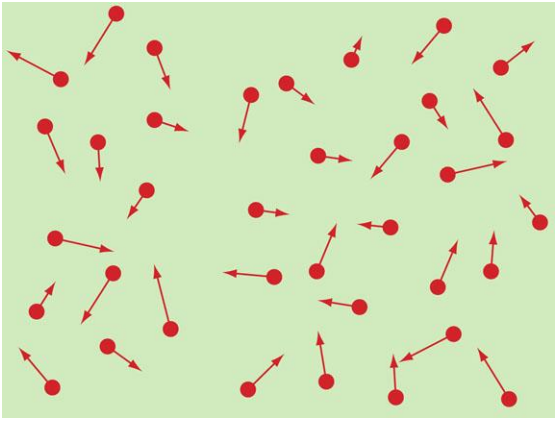
And remember: The mind is like a parachute, it only works when it is open.

Contents

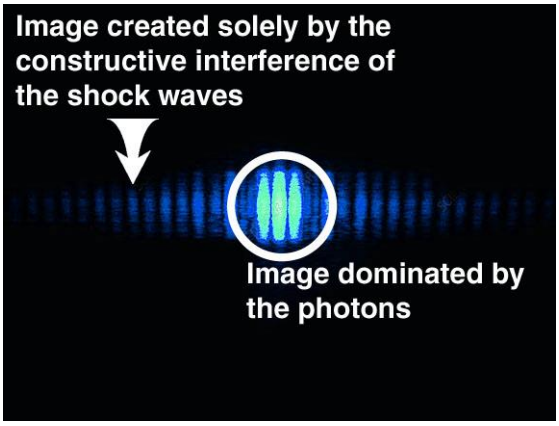
Layout of this document



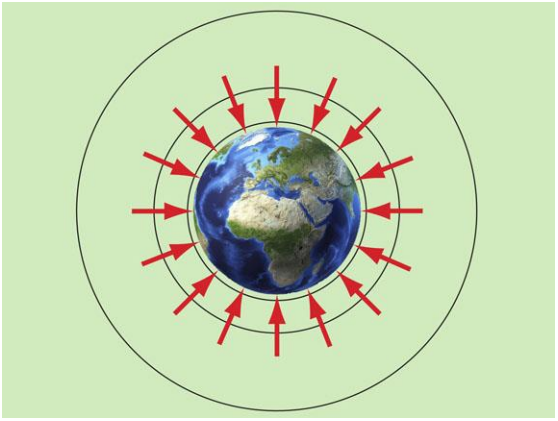
Energy compression waves



A depiction of quantum forces



Interference pattern



Forces acting on the Earth

Introduction

- The document starts with an overview of the issues (problems) that I believe are associated with our current understanding of light.

Chapter 1 – Fluid Mechanics and Wave Theory

- Critical to this discussion is an understanding that not all waves have the same properties.
- For example, the actions of constructive and destructive interference can only occur in certain conditions, and for certain types of waves.

Chapter 2 – Quantum Forces

- This paper introduces the concept of quantum forces, which are assumed to be the building blocks of energy.
- Rather than referring to an energy-filled universe, the document refers to a force-filled universe.

Chapter 3 – The Speed of Causality

- Critical to the actions of these quantum forces is the reaction time of these forces.
- The paper links this reaction time to the speed of causality, and therefore to the speed of light.

Chapter 4 – Is Light a Particle?

- Discussion is provided that supports the idea that a photon exists as a virtual particle, not as a physical particle.

Chapter 5 – Is Light a Wave?

- Discussion is provided that supports the idea that a photon travels as a longitudinal compression wave.

Chapter 6 – The Properties of Light

- A summary of the revised properties of light.

Chapter 7 – The Double Slit Experiment

- An explanation of how a single photon can experience constructive and destructive interference.

Chapter 8 – Polarisation and the Triple Filter Experiment

- An explanation of the triple polaroid filter experiment.

Chapter 9 – Einstein's Mistakes

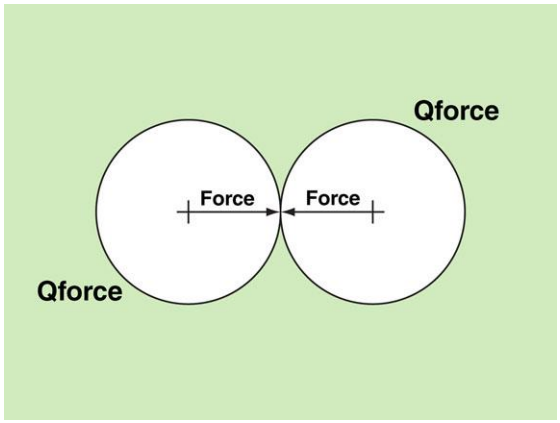
- This chapter explores the potential problems associated with Einstein's theories on light, time and gravity.

Terminology

Aether (not really!)

Aether

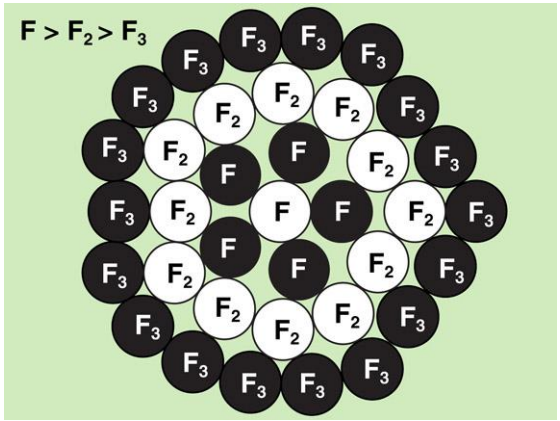
- The term ‘aether’ has held several meanings over the years as the term has gone in and out of favour by the scientific community.
- In this document, I will use the term to refer to whatever substance fills space.
- Currently it is assumed by most scientists that aether consists of ‘energy’.
- I am going to assume that aether is the product of expanding ‘quantum forces’.



Interaction between quantum forces

Quantum force (Qforce)

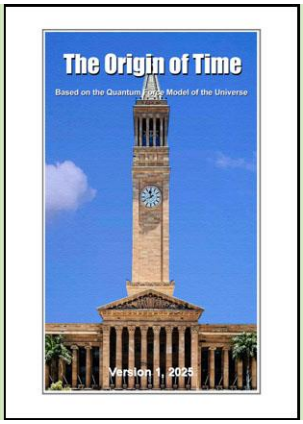
- The term quantum force is used to describe the smallest element of a force.
- It is my opinion that the science of astrophysics becomes easier to explain if we replace the idea of an energy-filled space with a force-filled space.
- Energy can be viewed as a measure of the ability to apply a force.
- (The term Qforce is used when there is insufficient space in the text box to insert the full term.)



A concentration of quantum forces

Concentration of quantum forces

- Technically, any cloud of quantum forces would have some degree of concentration.
  - Concentrated quantum forces have a concentration greater than background levels (i.e. matter and virtual particles).
  - Free quantum forces are the non-concentrated background forces that primarily fill space (i.e. the aether)
  - Attached quantum forces: some are firmly attached to matter, while travelling quantum forces travel with matter but move more freely.

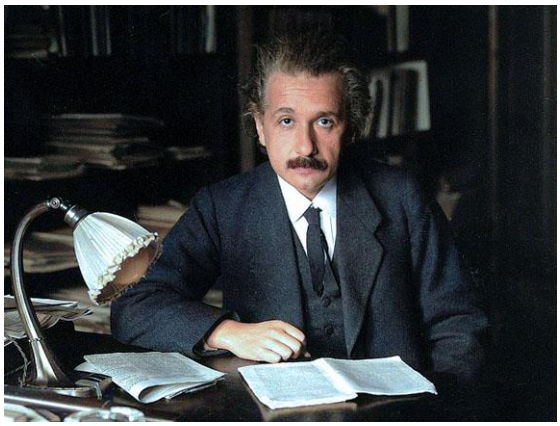


The origin of Time, 2025

Time and time

- In an attempt to make the text easier to understand, I have adopted the following usage of Time (with a capital) and time without a capital:
  - Time: meaning the mechanism that generates time (e.g. universal time).
  - time: meaning the action or progress of time (e.g. clock time).
- However, I currently believe that universal time exists only as a human invention, and therefore is not different from clock time.

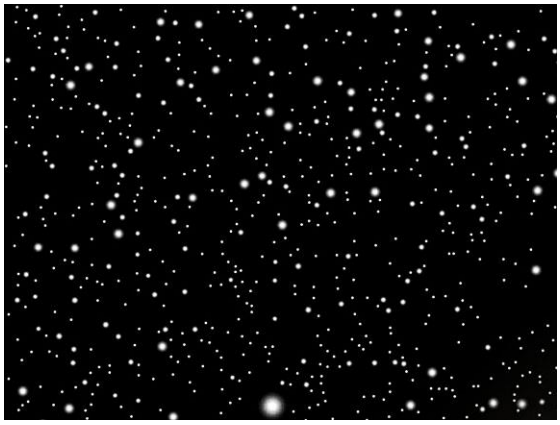
Potential errors by past researchers



Albert Einstein (1920)

Einstein's special relativity

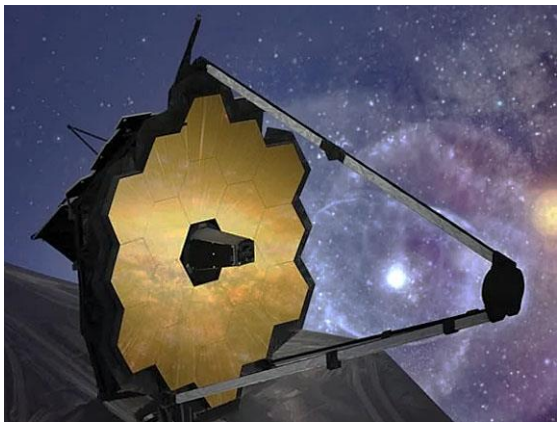
- Albert Einstein linked his theory of special relativity to two assumptions:
  - The laws of physics are invariant (identical) in all inertial frames of reference (i.e. frames of reference with no acceleration).
  - The speed of light in a vacuum is the same for all observers.
- It is this latter assumption that interests me because I believe that 'light' is no more complex than 'sound'.



Space

What is a vacuum?

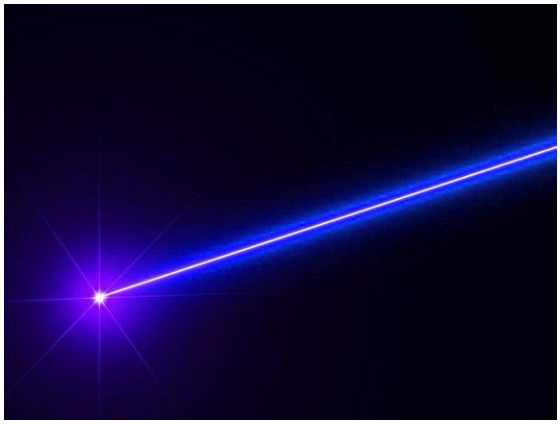
- I do not know how Einstein would have defined a 'vacuum'.
- Did he consider a vacuum to be a region of space that contains no physical matter, but some non-physical energy?
- Or did he consider a vacuum to be a region of space that contains nothing physical or non-physical?
- I will put it to you that there is no true vacuum within the bounds of space, only beyond space (i.e. outside our universe).



James Webb Space Telescope

There could never be a vacuum in space

- The Big Bang didn't 'explode' isolated bits of energy and matter into space.
- The Big Bang was an expansion of a homogeneous body of energy or quantum forces, which continues today.
- There is no point in space where the James Webb telescope, if placed there, would not be able to see billions of stars, which means billions of stars are sending information (photons) to that exact location.



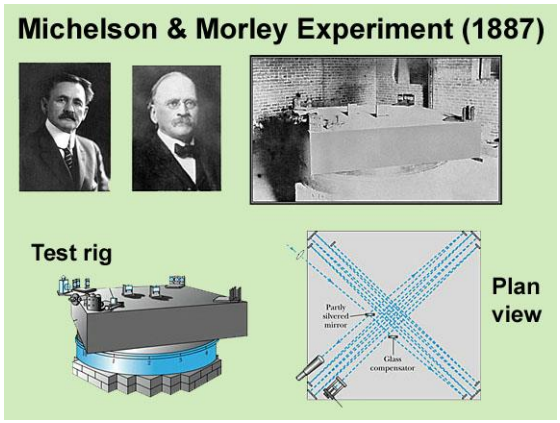
Light

The speed of light is not a constant

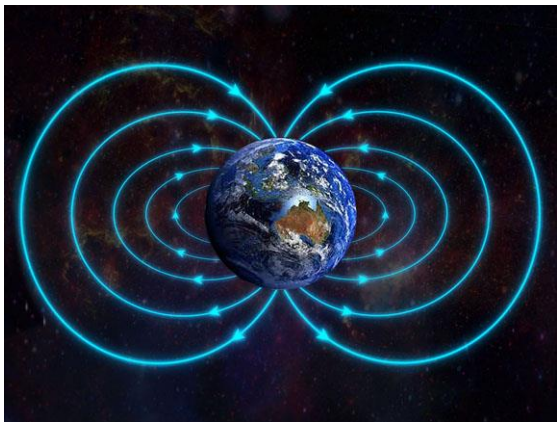
- Einstein's theory suggests that light has a constant speed in a vacuum.
- To the best of my knowledge (which isn't great), Einstein was not suggesting that the speed of light is a constant within all transparent media.
- I will put it to you that:
  - light cannot exist in a true vacuum
  - light cannot travel through a vacuum
  - the speed of light varies with the properties of the media.

Potential errors by past researchers

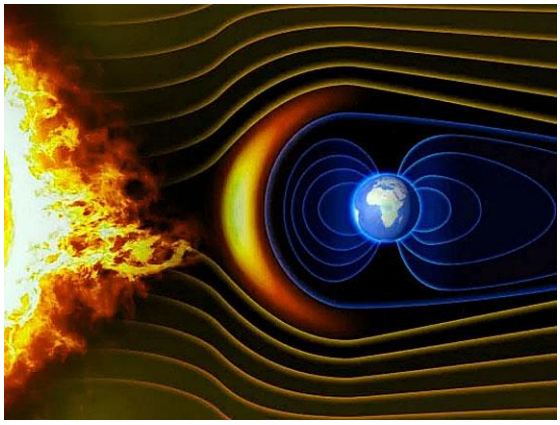
Speed detection



Michelson–Morley experiment



Earth's magnetic field



Deflection of solar winds

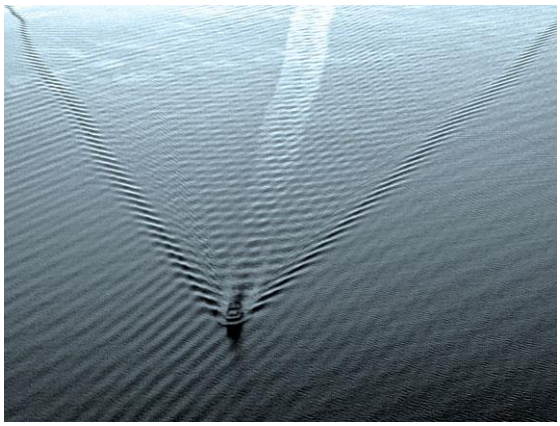
The speed of light

- The speed of light is governed by the speed of causality.
- The speed of causality is a measure of the reaction time of the basic forces that cause actions within the universe.
- We can acknowledge these basic forces by replacing our assumption of an energy-filled universe, with an equally plausible force-based universe.
- The speed of causality now becomes the reaction time of 'quantum forces'.

Michelson–Morley type experiments

- The Michelson–Morley experiment is believed to demonstrated the non-existence of an aether-filled space.
- These experiments form one of the fundamental tests of special relativity.
- However, none of these experiments could ever measure, or detect, the existence of an aether-filled space.
- I believe the conclusions developed from these experiments are wrong for the following reasons:
  - space results from the expansion of concentrated quantum forces (or the expansion of energy if that is what you prefer to believe), i.e. the Big Bang
  - at any instant, these quantum forces can exist in two forms: concentrated and non-concentrated
  - the movement of non-concentrated quantum forces ('energy' if you prefer) generates the action of magnetism
  - the movement of concentrated quantum forces generates the action of electricity
  - quantum forces have only one action, that being to repel (push away from) other quantum forces
  - the Earth is formed from concentrated quantum forces (i.e. matter)
  - non-concentrated quantum forces exist throughout the fabric of the Earth, as well as surrounding the Earth, forming Earth's magnetic field
  - the Earth is attached to, and moves with, this magnetic field, which is its own bit of 'aether'—so Michelson–Morley type experiments are simply showing that the Earth's magnetic field moves with the Earth!

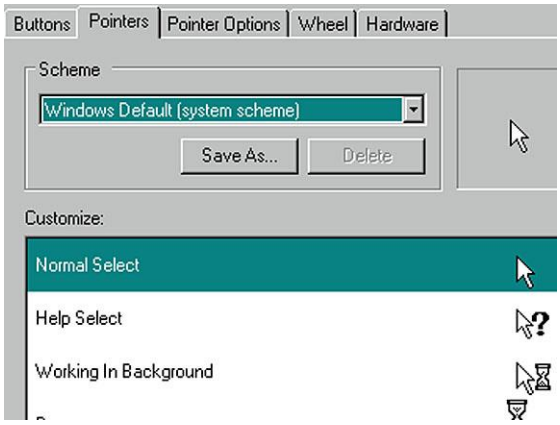
Potential errors by past researchers



Speed boat wake

When a wave is not a wave

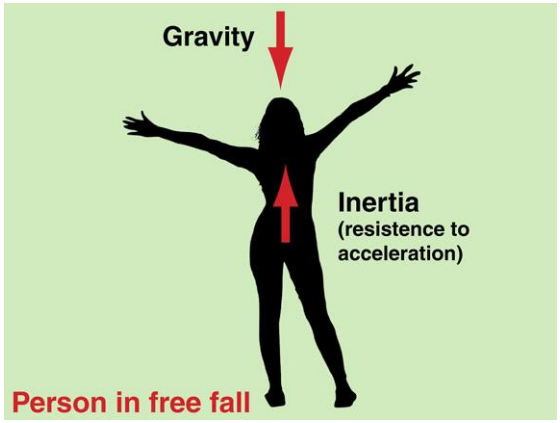
- There has been a lot of research dedicated to finding out if light travels as a particle, or as a wave.
- I will put it to you that every particle creates waves when it moves through a media, but that does not make every particle a wave.
- Boats generate waves, but they aren't waves.
- Light can only exist when it is moving, and when it moves it generates waves, even in space, but does that mean it is a wave?



Computer screen pointer

When a particle is not a particle

- Is the 'pointer' on your computer screen a particle?
- When you move a pointer across a screen, does the pointer physically move, or does it just appear to move?
- Is an ocean wave a 'particle' even though it is just a flow of energy?
- If we define a particle as any form of concentrated quantum forces, then light is a particle, but if we define a particle as physical matter, then light is not a particle, it is just a compression wave of forces.



Person in free fall

A person in free fall

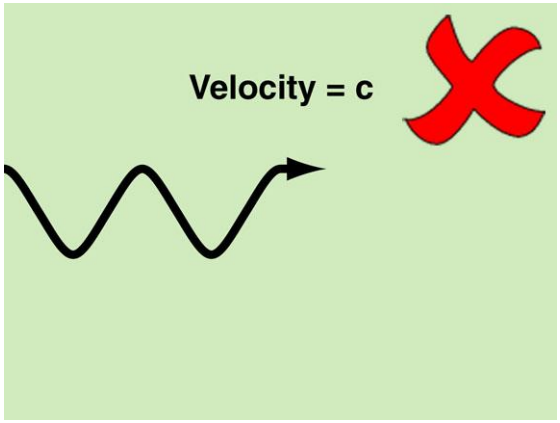
- Einstein believed that a person in free fall is not subject to the force of gravity:
  - he believed that gravity was not a force
  - he believed that a falling person cannot fell the actions (acceleration) of gravity.
- However, the reason we cannot feel the force of gravity is because gravity is an internal force, acting on each individual atom that makes-up our body, not an external force acting on the surface of our body—Einstein was wrong!.

Positive (pushing) force

A force can only be a 'pushing' action

- A force can only exist as a positive pushing force.
- There is no such thing as a pulling, attracting or suction force.
- The appearance of a attracting force is simply an indication that that particular action (force) is not fully understood.
- All forces, and all actions, ultimately result from quantum forces.
- And the so called, four known forces, all originate from quantum forces.

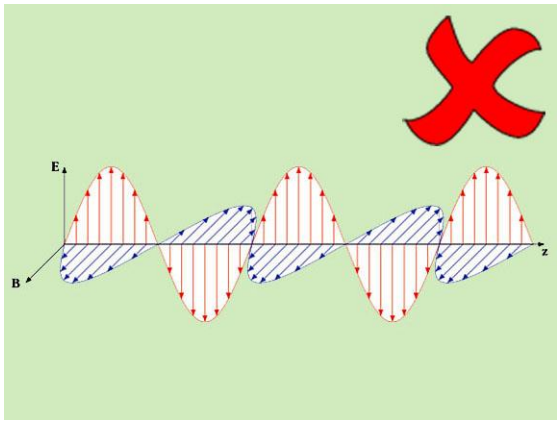
Potential errors in our current understanding of light



Not a transverse wave

Not a transverse wave

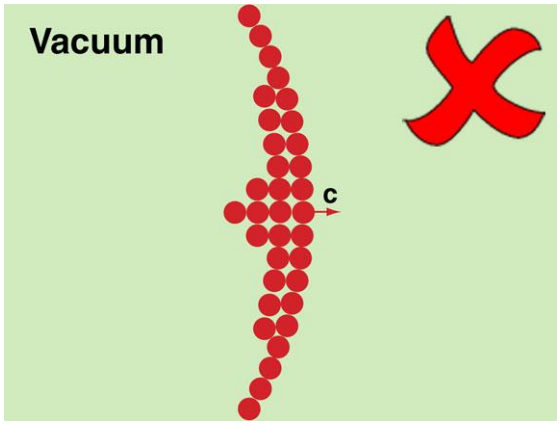
- Light moves as a longitudinal wave, not as a transverse wave.
- A photon is a localised concentration of quantum forces (energy), much the same as sound is a localised concentration (compression) of the media through which it travels.
- Just as sound is the movement of a compression wave through matter, light is the movement of a compression wave through non-matter (non-concentrated energy).



Not electromagnetic radiation

Not electromagnetic radiation

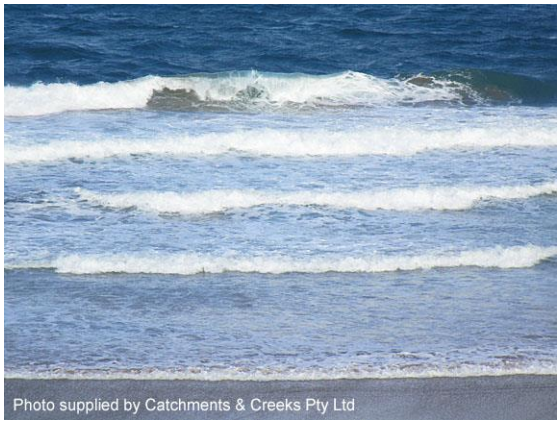
- It is misleading to suggest that light is a form of electromagnetic radiation.
- Electromagnetic radiation is a by-product of this movement.
- Electricity is the movement of concentrated quantum forces.
- Magnetism is the movement of non-concentrated quantum forces.
- Light causes the movement of both concentrated quantum forces, and non-concentrated quantum forces.



Light as a compression wave

Not able to travel through a vacuum

- A photon is a compression of quantum forces (or energy if you prefer).
- However, a photon is not a defined package of energy (a particle) moving through empty space, but a flow of energy moving through a field of energy.
- Light can only move through a field of energy (or quantum forces as I prefer).
- Light cannot exist unless it is moving.
- Light cannot travel beyond the edge of space, it can only build more space.



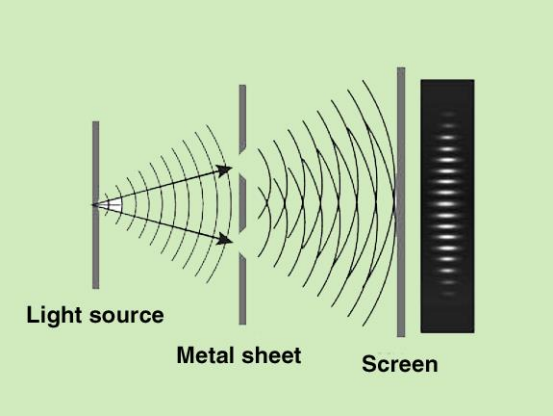
Breaking coastal waves

Constructive interference

- If light were to travel as a particle, within a particle wave, then it would not be able to experience constructive or destructive interference.
- Only energy waves can experience constructive or destructive interference.
- Deep water waves, including ocean waves, are examples of energy waves.
- Breaking coastal waves are examples of particle waves, which cannot experience constructive or destructive interference.

Executive Summary

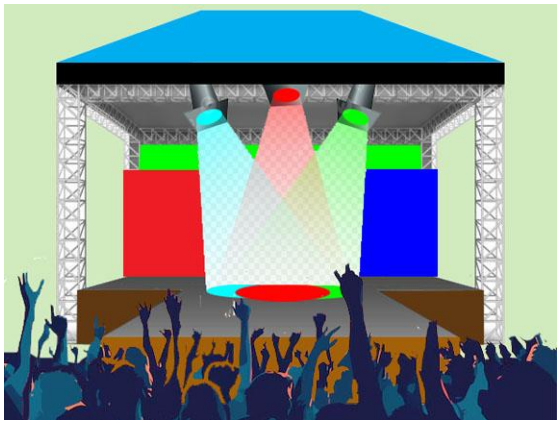
Executive summary



Double slit experiment

From the double slit experiment

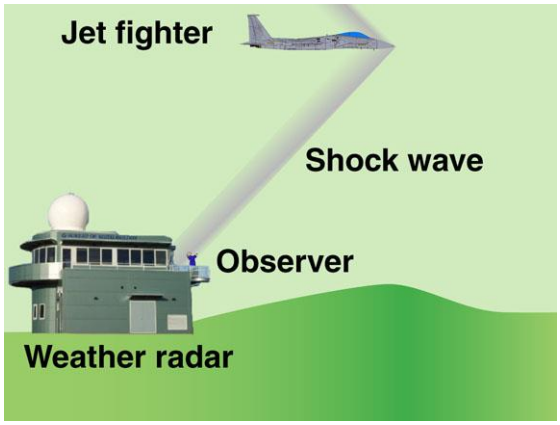
- From the double slit experiment we learn that light is able to generate waves that can experience constructive and destructive interference.
- This means that the waves generated by light are energy waves, not particle waves.
- This does not prove that light is not a particle, but simply that the waves generated by light are energy waves.
- As energy waves, these waves must be longitudinal waves, not transverse waves.



Cross flow of spot lights

From crossed beams of light

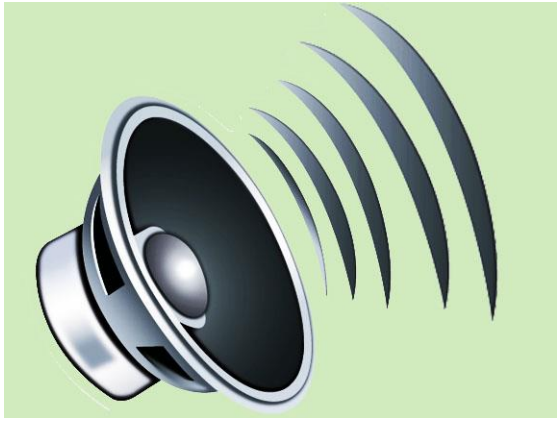
- From the crossing of two beams of light we learn that light must not contain physical particles.
- Only energy waves and virtual particles can cross the path of each other without experiencing a change of momentum or direction.
- The fact that we can see stars at night also confirms that light is not deflected or scattered as a result of its interaction within other light.



Jet fighter breaks the sound barrier

From aerodynamics

- From aerodynamics we learn that when a particle (say a jet fighter) approaches the critical velocity of air (i.e. the speed of sound), a shock wave is produced.
- The same lesson can be learnt from fluid mechanics.
- This tells us that if light travels at the critical velocity of aether (i.e the speed of causality), then light would produce a shock wave in the aether.

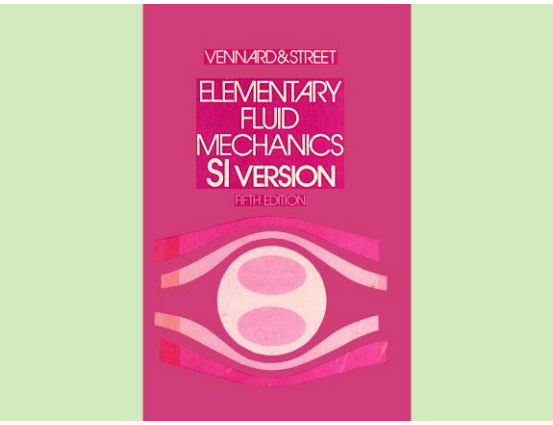


Sound

From the movement of sound waves

- From the movement of sound waves we learn that energy waves can generate shock waves when the energy transfer occurs at the speed of causality.
- This also means that both physical particles and virtual particles can generate shock waves when the particle moves at the speed of causality.

Executive summary



Fluid mechanics text book

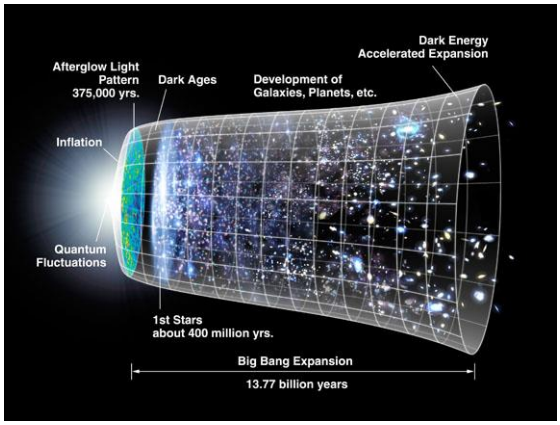
From fluid mechanics

- From fluid mechanics we learn that:
  - only energy waves can experience constructive and destructive interference
  - only energy waves can cross each other without a loss of energy or change in direction
  - an energy wave can deliver an impact force
  - and that energy waves cannot travel through a true vacuum.

LIGO Livingston Observatory

From gravitational waves

- From the detection of gravitational waves we learnt that space must not contain vacuous regions.
- A gravitational wave is an energy wave, which means it cannot travel through a true vacuum.



Expansion of the universe

From the rate of expansion of the universe

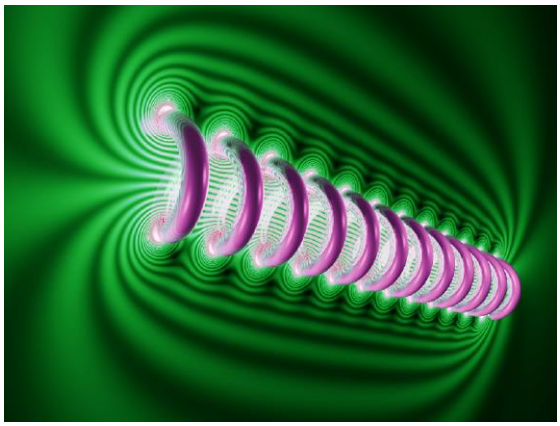
- From the rate of expansion of the universe we learn that the universe is not expanding at the speed of light.
- Indirectly we learn that light must collapse as it approaches the edge of space, after which it returns to being just part of the general aether.
- The same thing happens when light passes through certain filters, such as polaroid filters.

The light from stars and galaxies

From our ability to see stars

- From our viewing of stars we learn that:
  - light is not scattered by its interaction with other photons
  - light travels as a three-dimensional compression wave, rather than individual photons
  - space cannot contain a true vacuum because there is no location in space where the light from billions of stars cannot travel.

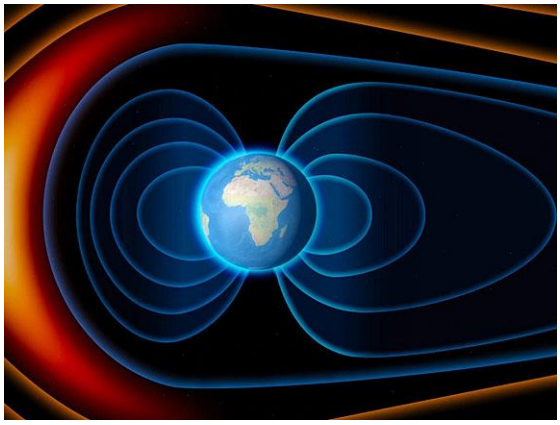
Executive summary



Electromagnetism

From electromagnetism

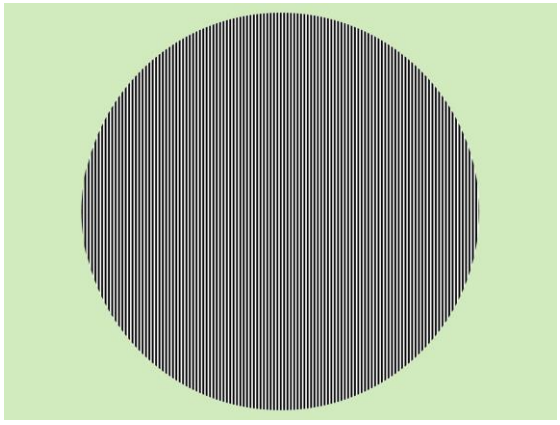
- From electromagnetism we learn that
  - aether is attached to physical matter
  - the movement of physical matter causes the movement of the surrounding aether
  - the movement of physical matter generates electricity
  - the movement of the attached aether generates magnetism
  - the movement of light must generate both electrical and magnetic properties.



Solar winds

From Earth's magnetic field

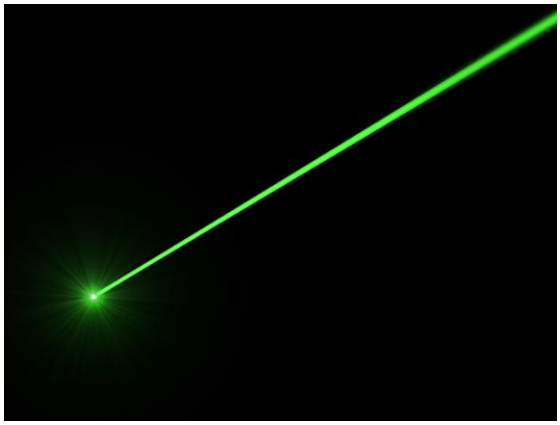
- From Earth's magnetic field we learn that the Earth travels with a substantial cloud of attached aether (space).
- This attached aether protects the Earth from free aether winds (solar winds).
- The extent of this attached aether (i.e. quantum forces) is represented by the extent of the Earth's magnetic field.
- Returning Apollo spaceship can bounce off Earth magnetic field, not the atmosphere!



Polaroid filter

From polaroid filters

- From polaroid filters we learn that:
  - light does not travel as a transverse wave, even if reflected
  - a photon uses part of its energy to form the attached shock wave
  - the width of the shock wave is macro in size (say several centimetres), and may represent the wave length
  - a photon will collapse if it loses too much of its energy while trying to rebuild its shock wave (after passing through a filter).



Laser beam

Conclusions

- From the general sciences we must come to the conclusion that light:
  - initiates its travel as a centralised energy pulse (photon), and this movement generates a shock wave that travels with the photon
  - it travels as a virtual particle
  - it travels as a longitudinal wave
  - it has electrical & magnetic properties
  - it cannot travel through a vacuum
  - it does not travel at a constant speed.

Executive summary (continued)

I started with four assumptions:

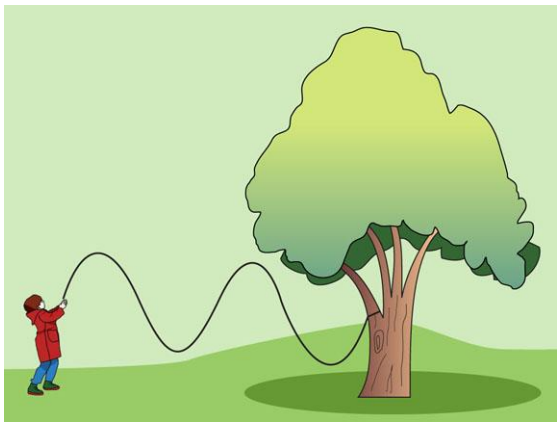
- The universe commenced with the Big Bang.
- Quantum forces were the primary outcome of the Big Bang, not energy; and these forces have just one action—to repel all other quantum forces.
- Time exists as a by-product of moving quantum forces, but the key parameter is the speed of causality, not 'time'.
- Electricity is the product of moving concentrations of quantum forces (e.g. matter), and magnetism is the product of moving non-concentrated quantum forces (aether), which is what forms the Earth's attached magnetic field.

The logic of my argument:

- From the double slit experiment we know that light experiences constructive and destructive interference.
- From wave theory we know that only energy waves can experience constructive and destructive interference; therefore if light does travel as a wave, it must be an energy wave, not a particle wave.
- We know that light must travel as a longitudinal compression wave because energy waves can only exist as longitudinal compression waves (ocean waves and internal waves, which are both energy waves, only exist as transverse waves because they exist within a gravitational field).
- We know that space must not contain regions of 'vacuum' (vacuous zones) because:
  - gravitational waves cannot move through a vacuum
  - energy waves, such as light, can move through space
  - the Michelson–Morley experiment cannot prove the existence, or non-existence, of an aether-filled space because the experiment was conducted within the Earth's attached magnetic (aether) field.
- We know that light must travel as a virtual particle (i.e. no moving matter except for the transfer of energy) because:
  - of the properties of constructive and destructive interference
  - the fact that two beams of light can cross without a change in momentum or direction (it does not matter if photons have, or do not have, mass)
  - photons from stars travel through (interact with) trillions of other photons without a change in direction.
- We know from fluid mechanics that objects, including virtual particles, generate shock waves when they travel at the speed of causality; therefore the movement of a photon at the speed of causality will generate a quantum force shock wave that travels with the photon, and which is subject to constructive and destructive interference within a double slit experiment.
- The movement of a photon must generate electricity, while the movement of the attached non-concentrated quantum forces must generate magnetism.

1. Fluid Mechanics and Wave Theory

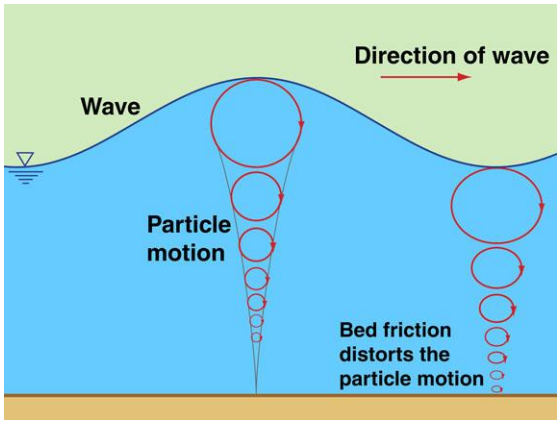
Wave mechanics



Transverse waves

Types of waves

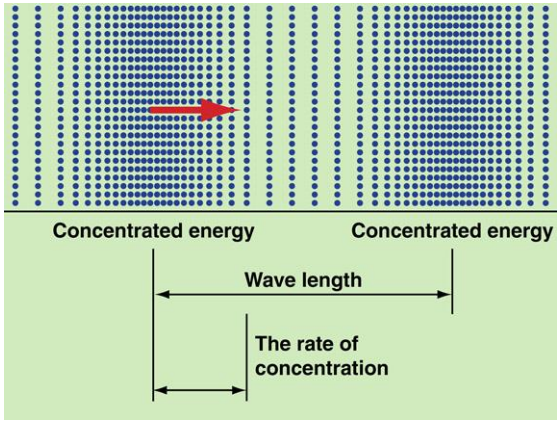
- Waves are either travelling waves, or standing waters.
- Standing waves are waves that appear stationary to an observer, even though they may be moving relative to the media.
- Most waves can be classified as energy waves or particle waves.
- These waves can be further divided into longitudinal waves and transverse waves.
- Waves can travel as a single wave, or as a set (group) of identical or mixed waves.



Wave mechanics

The properties of waves

- Waves normally involve a disturbance within a given media, or along the interface between different two forms of media (e.g. air and water).
- Energy waves involve a flow of energy, which may also be called a 'message'.
- Particle waves involve a flow of matter along with the flow of energy.
- The physics involved in the meeting, joining, or cross-flow (superposition) of two waves depends on the type of wave.



Energy compression waves

Energy waves

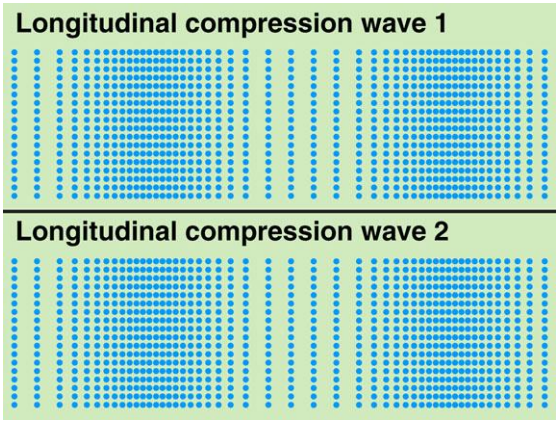
- Both energy waves and particle waves are examples of pressure waves.
- An energy wave transports only energy, i.e. there is no permanent movement of the physical matter.
- Examples of energy waves includes:
  - gravitational and ocean waves
  - electromagnetic waves and light.
- **Only energy waves can experience constructive and destructive interference.**

Surfing a coastal (broken) wave

Particle waves

- A particle wave transports energy and matter.
- Examples of particle waves includes:
  - coastal (broken) waves
  - tsunami waves travelling over land
  - weather fronts.
- Particle waves cannot experience constructive or destructive interference.
- Once a coastal wave has broken, it can not pass through another broken wave.

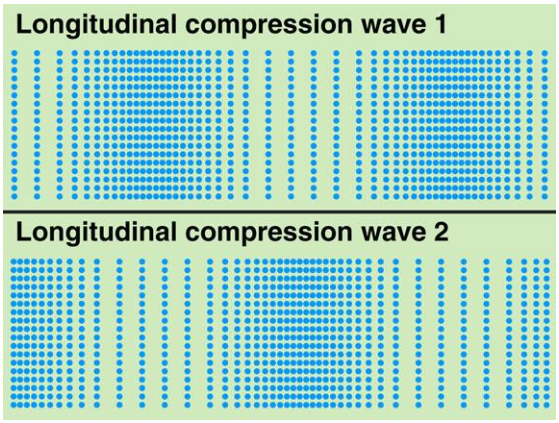
Wave interference



Two <u>constructive</u> longitudinal waves

Constructive interference

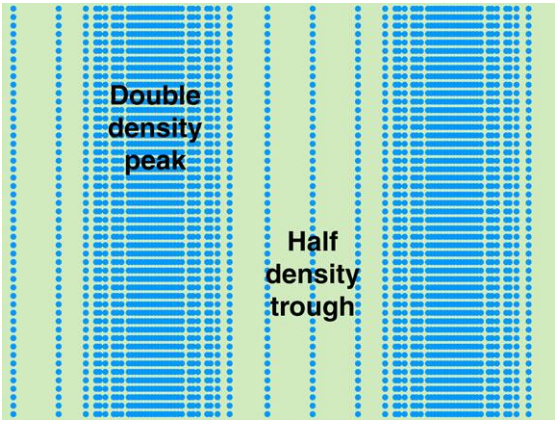
- In wave theory, constructive interference is the superposition of the 'positive' aspects of multiple waves, or the 'negative' aspects of multiple waves.
- Constructive interference is most commonly associated with the doubling of peaks and troughs when two waves meet.
- Constructive interference can occur on merging transverse (ocean waves) or longitudinal energy waves (e.g. light).



Two <u>destructive</u> longitudinal waves

Destructive interference

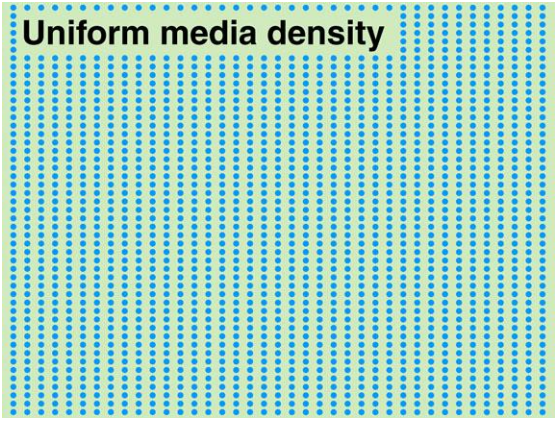
- Destructive interference is the superposition of a 'positive' aspect of one wave with a 'negative' aspect of an intersecting wave.
- Destructive interference is most commonly associated with the zero-amplitude wave produced when a wave crest interests with a wave trough of the same amplitude.
- Destructive interference can occur on merging transverse or longitudinal energy waves.



Combining two <u>constructive</u> waves

The interference of energy waves

- Energy waves are the only waves that can cross the path of other energy waves without loss of energy, or a change in direction.
- Energy waves are the only waves that can readily experience constructive and destructive interference without a loss of energy, or change in direction.
- **This outcome supports the idea that a photon is an energy wave, and <u>not</u> a particle, or particle wave.**

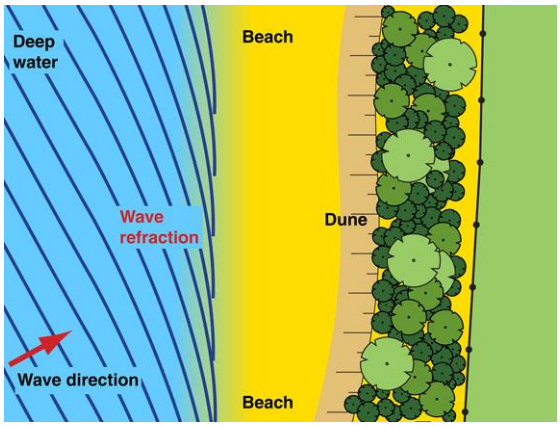


Combining two <u>destructive</u> waves

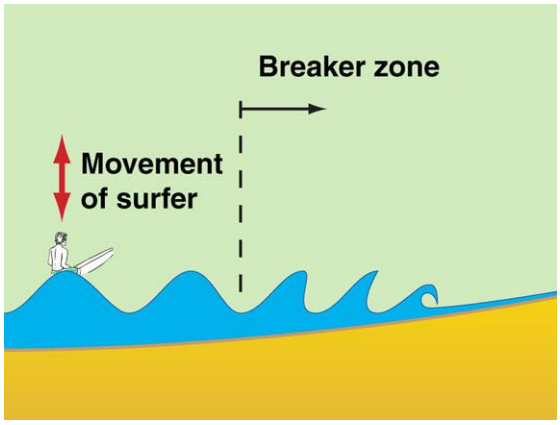
The interference of particle waves

- Particle waves can only experience constructive and destructive interference in special circumstances.
- Unlike ocean waves, coastal waves do not experience constructive or destructive interference—instead, the waves experience a transfer of momentum.
- These diagrams (left) are presented for demonstration purposes only. The density of the blue dots is not an accurate representation of the superposition of the waves shown in the upper diagrams.

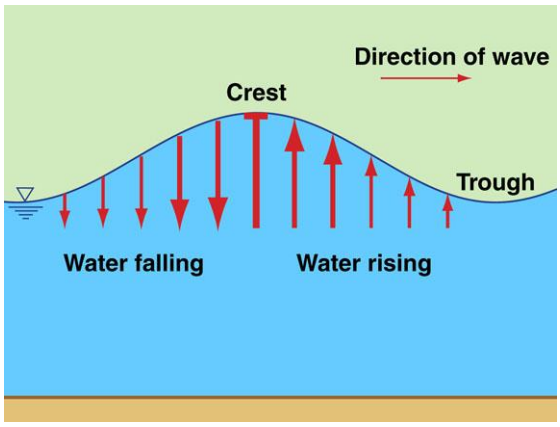
Ocean and coastal waves



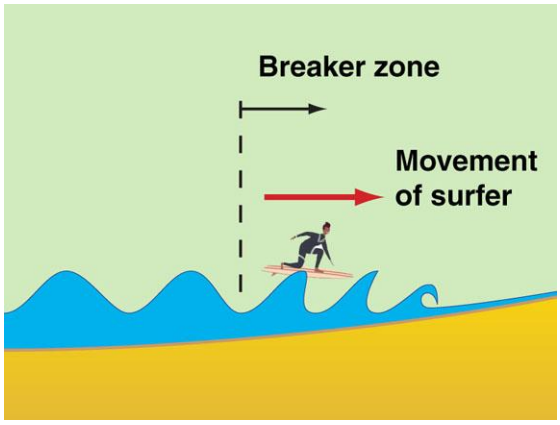
Coastal waves



Ocean wave (on the left)



Wave mechanics



Breaker (coastal) zone (on the right)

Terminology

- This document has adopted the following definitions.
- An ocean wave is a wind-generated, non-breaking, wave that travels across deep water.
- A coastal wave is a wind-generated wave that has curled and broken due to the effects of travelling through shallow water.
- A tsunami wave is a geologically formed wave that travels at the speed of a pressure wave when passing through deep water.

Ocean waves

- The water contained within an ocean wave does not experience any permanent movement.
- An ocean wave only experiences virtual movement, the same as the 'pointer' on your computer screen—it just appears to move.
- The form of an ocean wave moves, and the energy moves, but not the water.
- An ocean wave can experience both constructive and destructive interference.

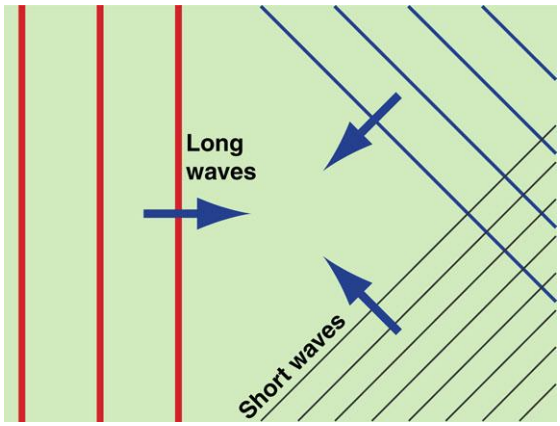
Ocean waves are transverse waves

- A transverse wave has its disturbance vectors moving perpendicular to the direction of propagation.
- It is the short-term vertical (transverse) movement of water particles that forms the profile of an ocean wave, thus ocean waves are considered to be transverse energy waves.
- Ocean waves do not carry significant mass or momentum, but the energy flow can produce a force.

Coastal waves are complex transverse and longitudinal waves

- A longitudinal wave has its vectors aligned with the propagation direction.
- The movement and profile of a breaking wave are defined by both the vertical and horizontal movement of the water particles.
- A broken wave is a particle wave that experiences physical movement.
- Broken waves have significant mass, momentum and energy flow, which a body surfer will feel from time to time.

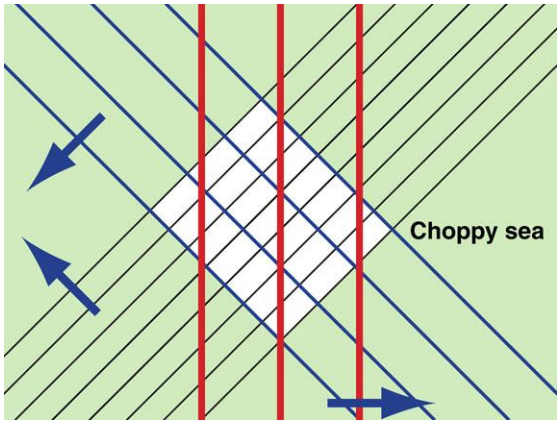
Ocean wave interference



Tree sets of ocean waves

Deep water (ocean) waves

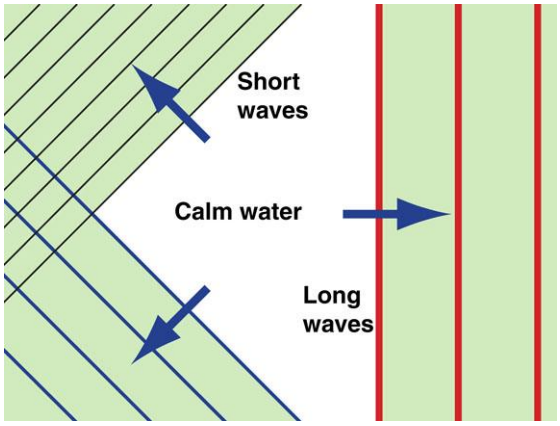
- Deep water waves can travel great distances across an ocean.
- They are able to travel such distances because they are 'virtual' waves (i.e. energy waves, or non-particle waves).
- This means they can move through other waves without a significant loss of energy, loss of momentum, or change in direction.
- The seas may look 'choppy', but experienced sailors can recognise the long waves passing through an area.



Constructive and destructive interference

Constructive and destructive interference

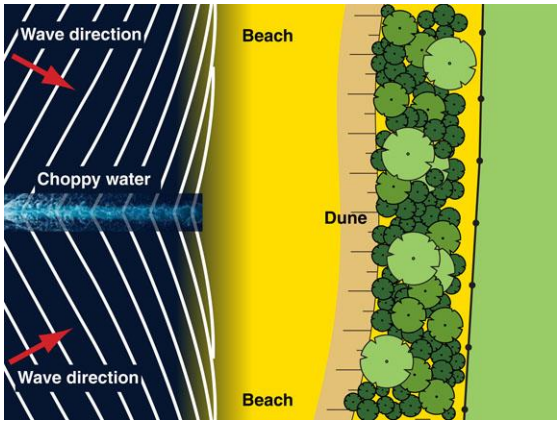
- When deep water waves do meet each other, their wave energy (water pressure) can experience constructive and destructive interference, which can make the seas even more choppy.
- However, there is no transfer of momentum between the waves.



No lasting interference

No change in energy or direction

- Once the waves have left an area of the ocean, the energy and elevated water pressure have gone, and the ocean can return to calm conditions.
- As far as their movement is concerned, deep water waves can be looked upon as equivalent to massless waves.
- It is not the 'mass' of the wave that is important; instead, it is the energy, or water pressure that is important.

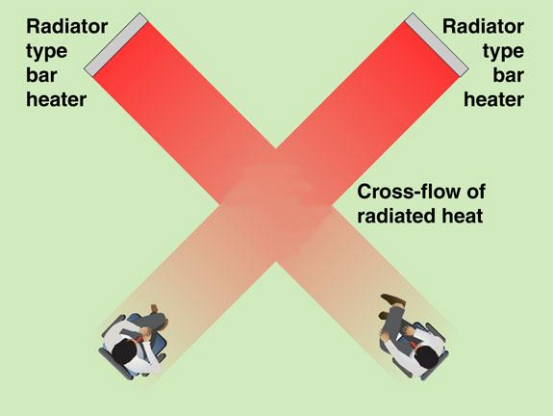


The 'collision' of two broken waves

Coastal (broken) waves

- Once a coastal wave breaks, and the upper waters of the wave tumble forward, the water becomes a particle wave.
- The wave has the ability to transfer momentum to objects that it hits.
- The mass of the wave now becomes important with respect to its total energy and power.
- And the wave can no longer pass through other waves, or experience constructive and destructive interference.

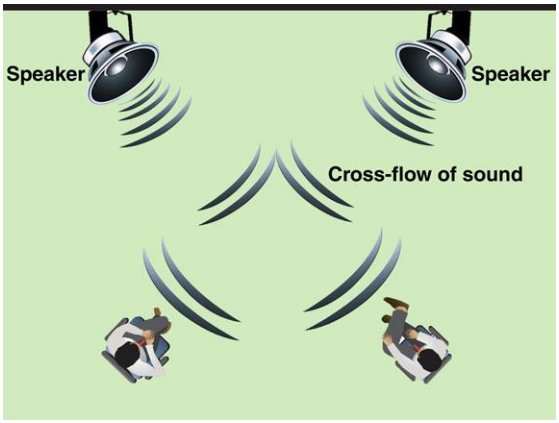
The different between energy flow and particle flow



Two radiator heats

Two radiator-type heaters (energy flow)

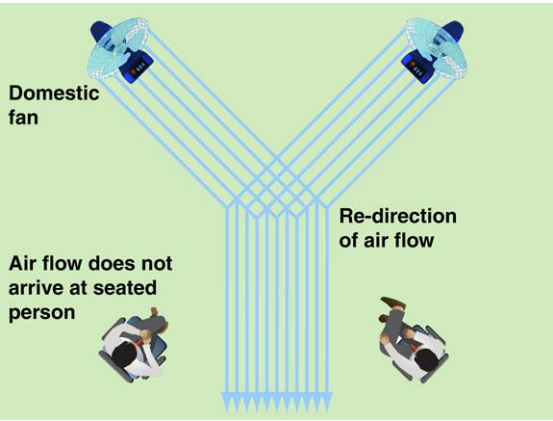
- Radiator heaters project their heat (energy) as rays, which convert to heat once the rays hit an object.
- (Fan heaters heat the air, then blow this hot air towards an object)
- If you were to set up two radiator heaters such that the energy rays crossed paths, then there would be no loss of energy, or change in direction by the energy rays:
  - i.e. both gentlemen would continue to receive the heat directed towards them.



Cross flow of sound waves

Two sets of sound waves (energy flow)

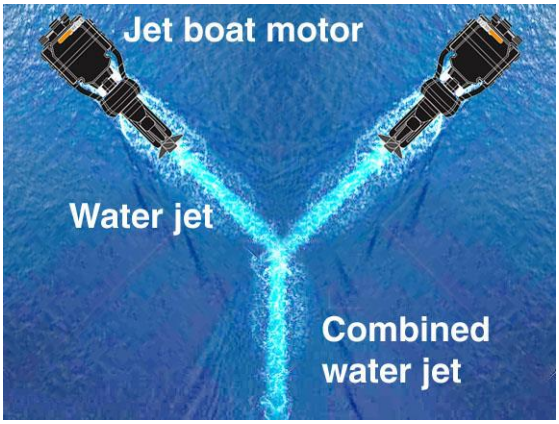
- If two sets of sound waves were to cross paths, then these two sets of waves would pass through each other with little loss of energy, or change in direction.
- Other than the effects of friction, ocean waves can similarly cross the oceans with little interference from other waves.
- However, because both sound and ocean waves incorporate a small degree of the movement of matter, there can be some interference at the point of intersection.



Two jets of air

Two jets of air (particle flow)

- In the above examples, it is only energy that is moving.
- In this example, two streams of air (i.e. physical matter) are trying to cross the flow path of each other.
- Two streams of air flow cannot cross each other without an exchange of momentum causing a loss of energy, and/or change in the direction of their travel.



Two jets of water

Two jets of water (particle flow)

- Similarly, two jets of water cannot cross the path of each other without a loss of energy, and/or change in direction.

The takeaway message:

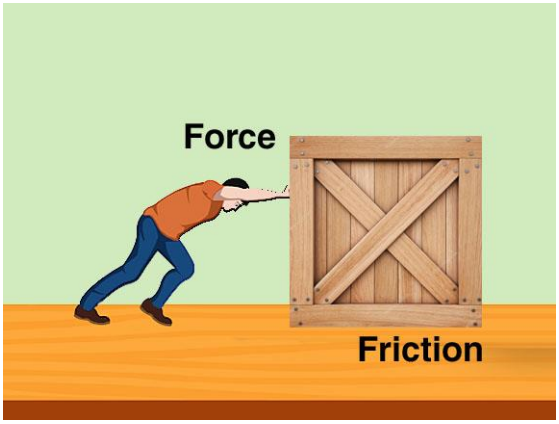
- A flow of energy can cross the path of another flow of energy.
- A flow of matter cannot freely cross the path of another flow of matter.
- Photons freely cross the pathway of other photons, so photons represent a flow of energy, not a flow of particles.

2. Introducing Quantum Forces

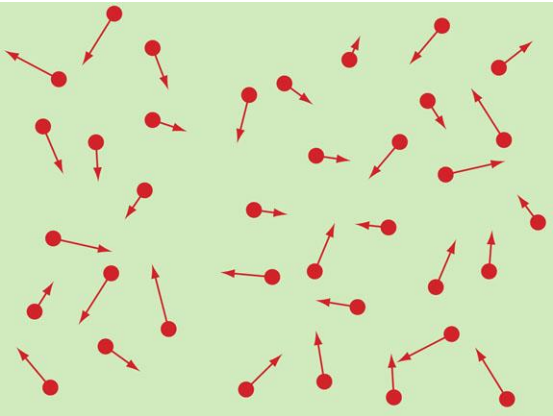
Introduction

It is just a new term for an old issue!

Dozer shifting earth



Actions of a force



Quantum forces

Introduction

- Currently we think of the universe as being formed from, and largely filled with, energy, but we can equally think of the universe as being filled with forces.
- There are advantages in changing our focus from energy to forces.

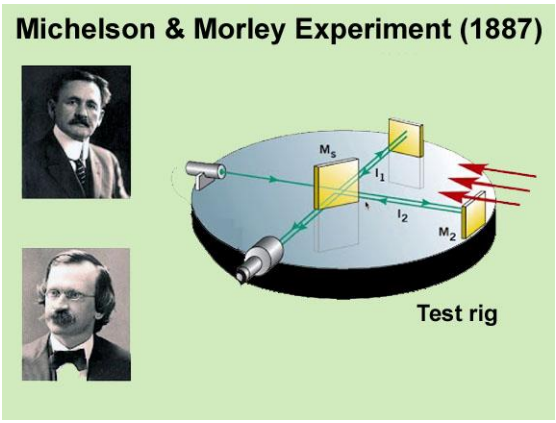
1. When we think about energy, we imagine an element that can be consumed.
   - The idea of a conservation of energy can be difficult to accept given our everyday interaction with 'energy', which is linked to food and fuel.
   - On the other hand, it can be easy to think of a 'force' as the mechanics of an action that can be sustained.
2. We generally find it easier to associate an action with a force, rather than with the term energy, which fuelled that force.
   - Think about a construction site—the potential for work to be done is usually linked to the amount of equipment (dozers & trucks), not the amount of fuel in the storage tanks.
3. It is easier to accept that our five senses are linked to forces, rather than energy.
   - we can see because of a force
   - we can hear because of a force
   - we can smell because of a force
   - we can taste because of a force
   - we can feel touch because of a force.
4. Finally, it is easier to think of the Big Bang (or the Big Expansion) as being caused by repelling forces, rather than a liberation of energy.

Introducing the 'quantum force'

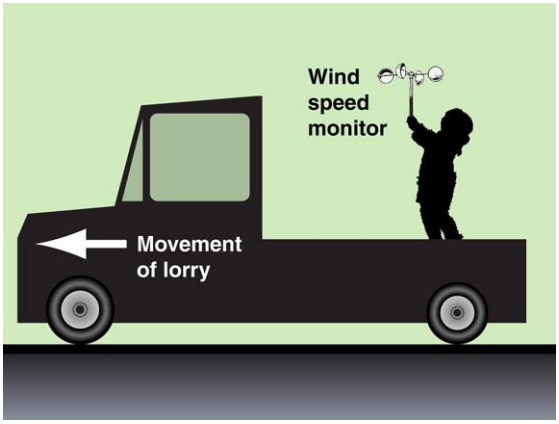
- So, allow me to introduce the term, 'quantum force'.
- I assume the term is already being used in quantum mechanics for other purposes, but in this document the term represents:
  - the foundation element of the universe.
- A quantum force is assumed to be an element that has no physical dimensions, but it commands an expanding region of influence as the universe expands from a singularity.

Michelson–Morley experiment

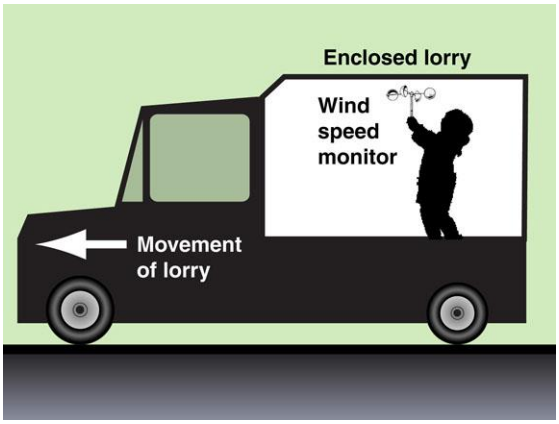
Albert Michelson and Edward Morley



Michelson–Morley experiment



Open lorry



Covered lorry

Introduction

- In the 1800s an idea existed that a supporting medium permeated space, through which light travelled.
- Sometimes referred to as ‘aether’, or ‘luminiferous aether’.
- In 1887, American physicists Albert Michelson and Edward Morley conducted an experiment that concluded that such a medium did not exist.
- This outcome opened the door for the acceptance of a vacuum in space.

Michelson–Morley experiment

- The Michelson–Morley experiment looked for evidence that the speed of light was affected by the speed of the Earth travelling through this aether.
- No effect on the speed of light was found, thus concluding the non-existence of an aether-filled space.
- BUT, there is a problem!
- Consider if someone wanted to test for the existence of ‘air’ by holding a wind speed monitor in the back of a moving truck.

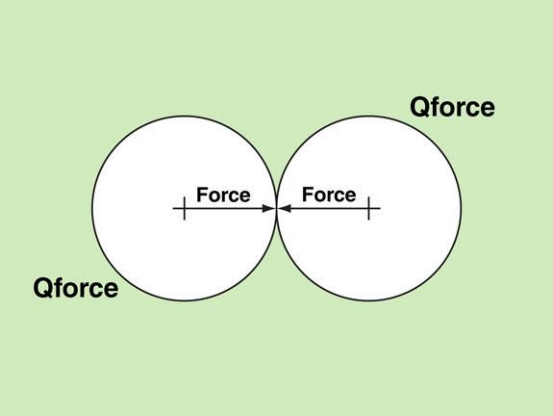
Testing the existence of ‘air’

- As alluded to above, this test involved a person standing in the back of an open lorry, while holding a wind speed monitor.
- If the lorry is moving through a medium of air, then the wind speed monitor should be able to detect the movement of air relative to the lorry.

The test experiences a problem

- However, on the day of the experiment the researchers were only able to hire a fully covered lorry.
- They conduct the experiment, but find that the wind speed monitor did not detect any air movement, indicating that a medium of air did not exist!
- But the problem is that while they were inside the covered lorry, the air was effectively captured by the lorry, and therefore moving with the lorry (the discussion continues over the page).

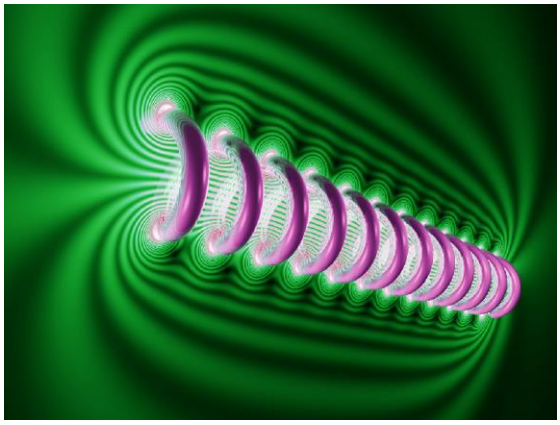
Michelson–Morley experiment



Two quantum force units

The action of quantum forces

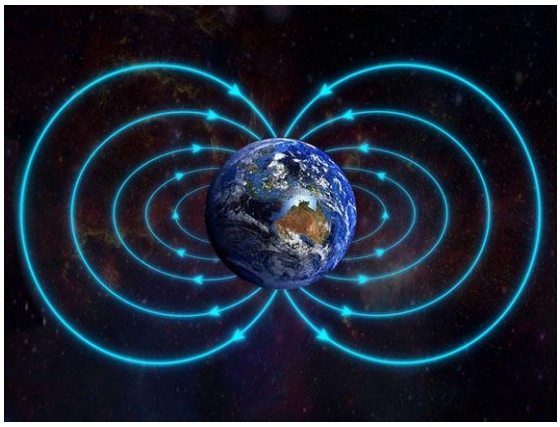
- Quantum forces have just one task, or action, and that is to repel all other quantum forces.
- It is from this one action that the universe was created, as well as every action that occurs within the universe.
- This action also forces any concentration of quantum forces to become more concentrated, and it is from this action that the four known forces of the universe arise, including gravity (refer to the last chapter).



Magnetic field

The creation of electricity and magnetism

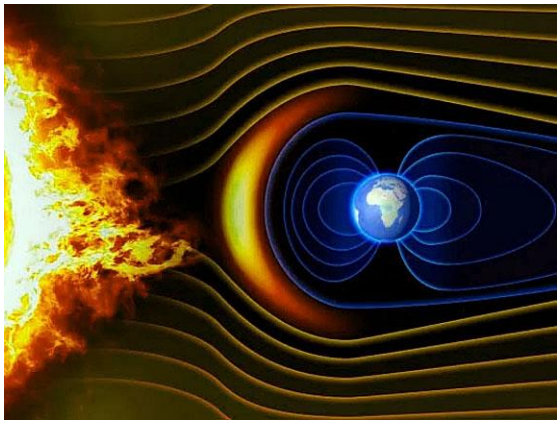
- Because of the repelling force that is enacted by all quantum forces.
- And because a concentration of quantum forces can only exist when surrounded by non-concentrated quantum forces.
- Everywhere matter goes, a surrounding cloud of quantum forces will also go.
- Electricity is the outcome of moving matter, which causes the movement of attached, non-concentrated quantum forces, which is what creates magnetism.



Earth's magnetic field

Earth magnetic field

- The Earth exists as a large body of physical matter, which means it is a large body of concentrated quantum forces.
- This means the Earth is both surrounded by, and travels with, a large cloud of non-concentrated quantum forces, which also exist throughout the Earth.
- The movement of electrons in the Earth's iron core causes these internal quantum forces to circulate, which, on its return loop, forms Earth's magnetic field.



Protection from solar winds

Conclusion

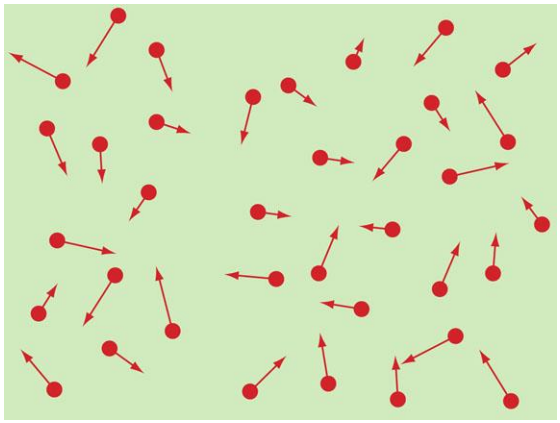
- Consequently, all Michelson–Morley type experiments will fail to demonstrate the existence of aether because:
  - the experiments are conducted within the Earth magnetic field
  - which means their test rig was travelling with the aether, rather than travelling through the aether.
- In fact, the mass of the test rig would itself carry with it some degree of attached quantum forces (aether).

Quantum forces

Space

Introduction

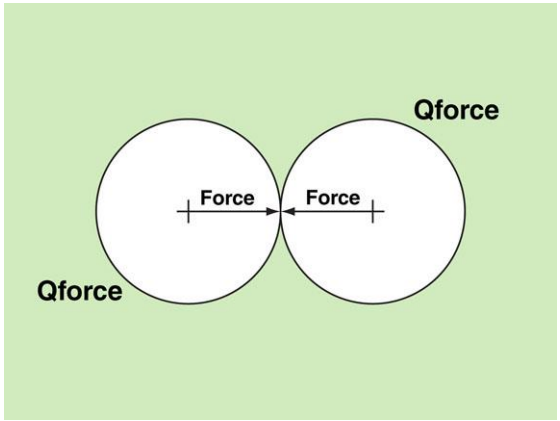
- Simply by replacing our concept of a universe filled with energy, with a universe being filled with quantum forces, we establish a basis for:
  - the make-up of all matter
  - the make-up of all forces
  - an explanation of gravity
  - an alternative understanding of time
  - an understanding that nothing physically exists within the universe.



Quantum forces

All forces in the universe originate from quantum forces

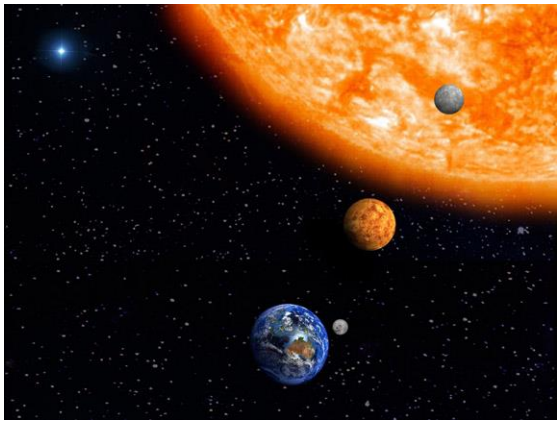
- The current belief is that there are four fundamental forces:
  - gravity
  - electromagnetism
  - weak interaction
  - strong interaction.
- However, through various paper published in 2024-25 I have demonstrate that all of these forces originate from quantum forces.



Two quantum force units

All forces are positive in magnitude

- A quantum forces (Qforce) is:
  - a positive force
  - a pushing force
  - a force that can only interact with other quantum forces, or concentrations of quantum forces (i.e. matter)
  - a force that can only act through close contact, even if such contact is in a virtual form.
- There can never be a true 'pulling' force.

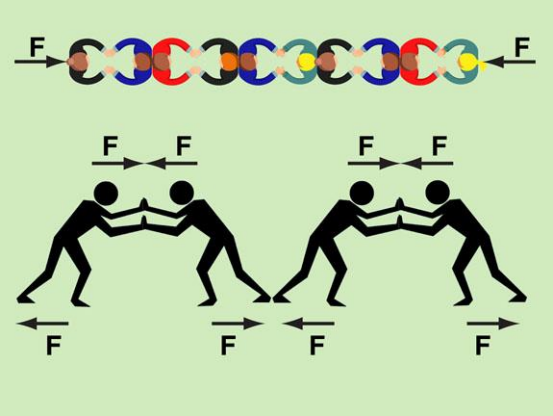


The effects of gravity

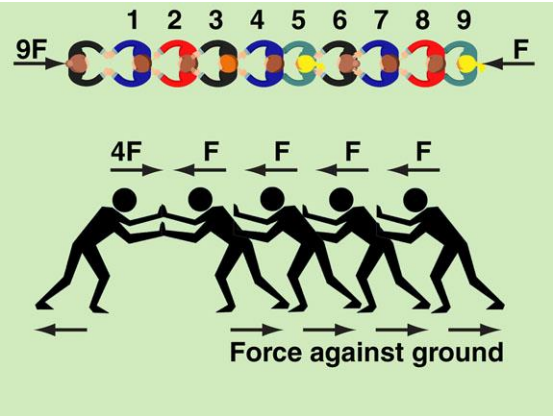
Action at a distance

- There is no such thing as a force acting at a distance.
- But, there is such a thing as an action at a distance, such as the effects of the Earth acting on the Moon.
- However, such an action can only occur as a direct result of forces acting directly on the object.
- Any observation of an apparent 'action at a distance', is simply an observation that fails to recognise the direct connection between the action, and the force.

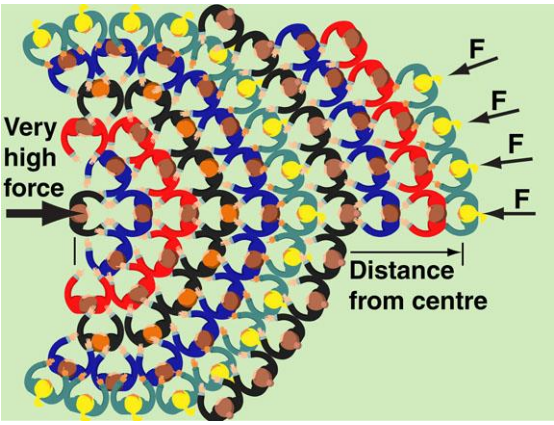
Quantum forces act as point forces, not like pressure



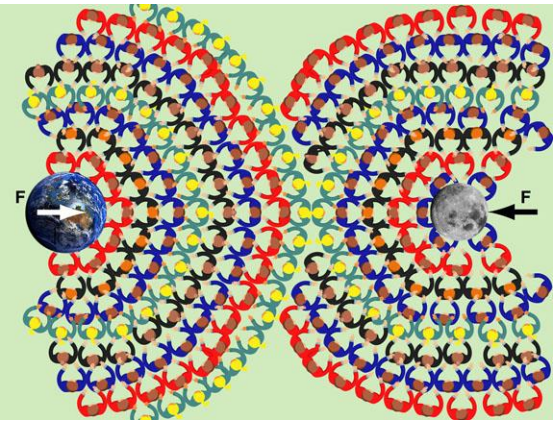
Simulating pressure force



Simulating quantum force



Simulating gravitational forces



Simulating planetary 'attraction'

The action of pressure

- It would seem logical to think of the forces exerted by quantum forces as acting like a fluid in a pressure container, but quantum forces don't act like pressure, they act like a collection of point forces.
- The following discussion is not perfect, but I hope that it will give you a bit of an idea.
- The action of pressure is like a crowd of people standing back-to-back, pushing each other such that the net force is balanced between any two people.

The action of forces

- Pressure is an action that produces a uniform force per unit area in all directions.
- However, the quantum forces that fill space work in a different way—if a concentration occurs (i.e. matter), then:
  - a concentration of attached quantum forces surrounds the matter
  - they push against each other as well as pushing against the matter
  - as much as they push outwards, they are pushed inwards with a greater force.

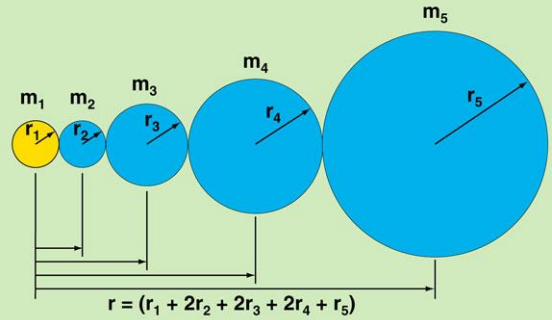
Forces on a central object

- The surface area of a sphere varies with the square of its radius (area = $4\pi r^2$).
- When quantum forces surround a planet, the surface area of the net force pushing towards the plant increases with the square of the distance from the planet.
- This means that the force acting on each quantum force decreases with the square of the distance, which causes the region of influence of each quantum force to increase with its distance from the planet (not shown in my diagrams).

Action of forces on two objects

- The forces that surround any star, planet or moon, extend across space for vast distances, but not indefinitely.
- When two celestial bodies are close to each other, the sphere of influence of the quantum forces that surround each moon or planet will overlap each other, and the net attracting forces will superimpose.
- Ultimately this action causes a net force to push these two objects towards each other, which we call 'gravity'.

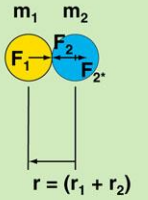
Creating the force of attraction and repulsion



Electron and attached quantum forces

$$F_1 = F_2 - F_{2^*} + F_3 - F_{3^*} + F_4 - F_{4^*} + F_5 - F_{5^*} + \text{etc}$$

$$F_2 = \frac{G.m_1.m_2}{(r_1 + r_2)^2}$$



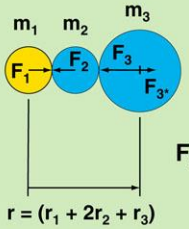
$$F_{2^*} = \sum \frac{(G.m_2.m_n)}{(r_2 + 2r_3 + 2r_4 + 2r_5 \ldots)^2}$$

F_{2^*} = sum of forces of attraction to outer quantum forces

Forces acting on mass-2

$$F_1 = F_2 - F_{2^*} + F_3 - F_{3^*} + F_4 - F_{4^*} + F_5 - F_{5^*} + \text{etc}$$

$$F_3 = \frac{G.m_1.m_3}{(r_1 + 2r_2 + r_3)^2} + \frac{G.m_2.m_3}{(r_2 + r_3)^2}$$

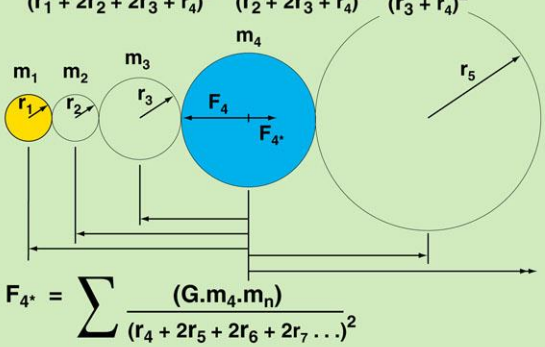


We could assume $m_2 = m_3$

$$F_{3^*} = \sum \frac{(G.m_3.m_n)}{(r_3 + 2r_4 + 2r_5 + 2r_6 \ldots)^2}$$

Forces acting on mass-3

$$F_4 = \frac{G.m_1.m_4}{(r_1 + 2r_2 + 2r_3 + r_4)^2} + \frac{G.m_2.m_4}{(r_2 + 2r_3 + r_4)^2} + \frac{G.m_3.m_4}{(r_3 + r_4)^2}$$



$$F_{4^*} = \sum \frac{(G.m_4.m_n)}{(r_4 + 2r_5 + 2r_6 + 2r_7 \ldots)^2}$$

Forces acting on mass-4

Introduction

- On this page I will describe the type of mathematics that demonstrates how the attached quantum forces ultimately generates a net force of attraction.
- This is NOT the correct mathematics, because in this example I have assumed that the effective size of the quantum force increases in proportion to distance, which is not correct (I believe).
- The correct analysis requires consideration of the mechanics in three dimensions—too hard for me!

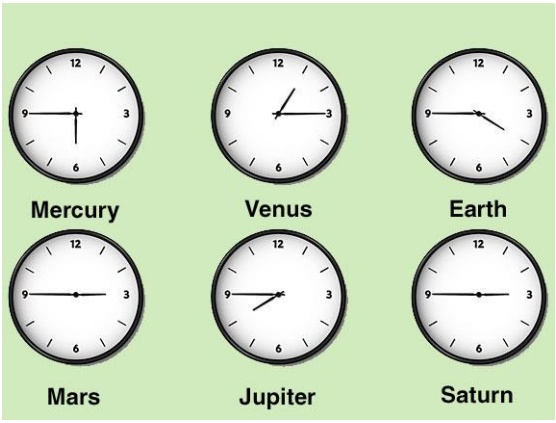
Forces acting on primary mass (m_1) and first secondary mass (m_2)

- There is a repelling force that exists between the primary mass (m_1) and the first attached quantum force (m_2).
- The primary mass can be anything from an electron to a planet, or a black hole.
- Key to this analysis is the relative size of the primary mass (r_1) compared to the attached quantum forces (r_2, r_3, r_4, etc.).
- For an electron; $r_1 > r_2$.
- For a nucleus; $r_1 >>> r_2$.
- The repelling force (F_2) that exists between the primary mass (m_1) and the first attached quantum force (m_2) is governed only by masses m_1 and m_2.
- The repelling force (F_{2^*}) that exists between the first attached quantum force (m_2). and the outer attached quantum forces involves mass m_2 and all the masses outside m_2.
- This same analysis is repeated for all the attached quantum forces until the outer most attached quantum force has an inward repelling force equal to the background repelling force of free aether.

The effect of particle size

- For a mass the size of our Sun, the attached quantum forces will extend beyond Pluto before the attached quantum force 'pressure' equals the background aether, after which, the net force converts to the repelling force of aether.
- For a primary mass the size of an electron, the distance from the electron before the net force converts from attraction to repelling in microscopic, which means electrons repel each other, rather than attract each other.

Time exists as a property of quantum forces



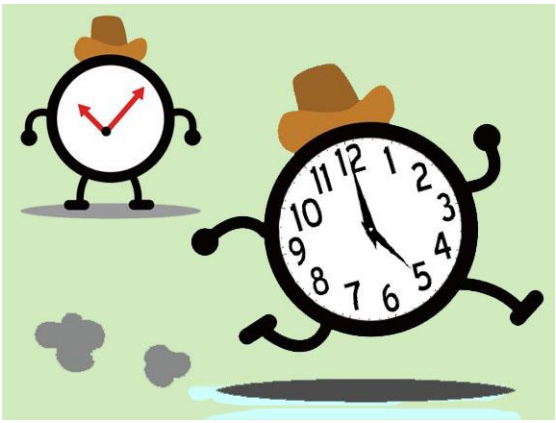
Clock time

What is Time?

- The big question is: Where does 'time' fit into a force-based model of the universe?

Author's note:

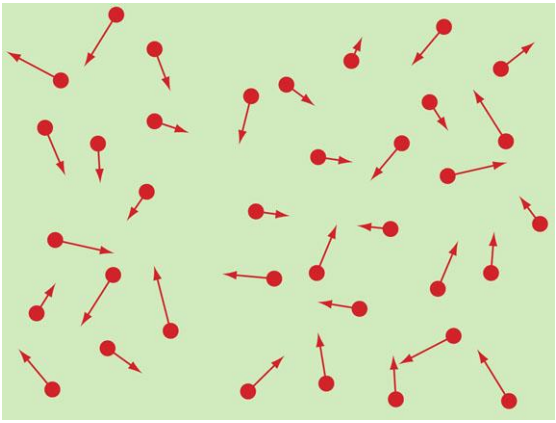
- Just to help with this discussion, I will refer to the element of Time, or universal Time, using a capital: 'Time'.
- I shall then refer to the action or progress of time (e.g. clock time) using all lower case: 'time' (but, of course, not at the beginning of a sentence).



The actions of time

What action does Time do?

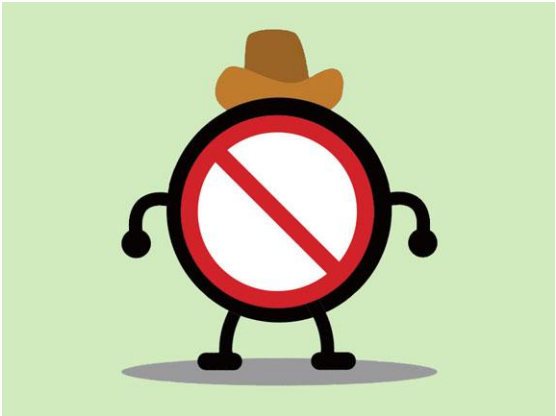
- If Time exists, what does it actually do, and how does it do it?
- What does Time do in order to allow the universe to progress from one time to another?
- Does Time rebuilt the universe ever millisecond?
- What is actually required in order to move an object from one location to another, which effectively is how we register the progress of time?



Quantum forces

The primary task of 'time'

- If we accept that the universe is formed from quantum forces, . .
  - and the response rate of a quantum force is governed by the speed of causality of that force, then . . .
  - all movement in the universe must link back to the speed of causality of each quantum force.
- This would suggest that the properties we assume exist between 'Time' and velocity are actually between the speed of causality and velocity.



Clock time stopped

Speed of causality vs velocity

- It is assumed that the speed of many actions, including atomic activity, is governed by the speed of internal force messages (or energy messages if you prefer).
- The ultimate speed of a force message is the speed of causality.
- As an object approaches the speed of causality, the speed of internal force messages will slow to a stop, thus a clock would stop, and electrons would stop moving within an atom!

Quantum forces acting on our five senses

How do I know matter exists?

Our five senses

- Our perception of physical matter is based on our five senses:
  - we see matter
  - we hear matter
  - we smell matter
  - we taste matter
  - we touch and move matter.
- These senses is a product of forces, which ultimately are generated by quantum forces, which have no physical existence, thus matter has no physical existence.

Human eye

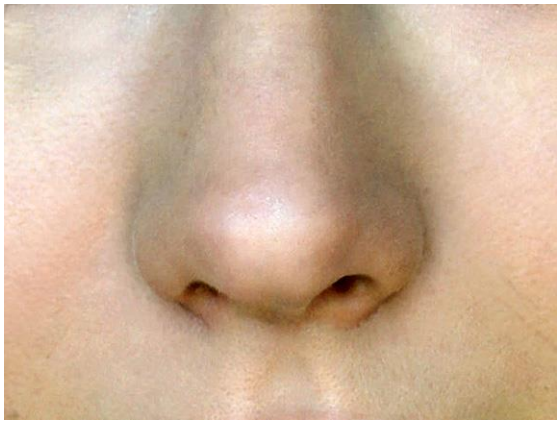
Light

- The sensation of light is **only** produced within the minds of living creatures.
- Light becomes visible to humans because the photons are capable of causing physical excitation within all molecules, which leads to changes in the chemistry within the visual molecule retinal of the eye.
- 'Light' is just a form of energy.
- Therefore, the universe exists in total darkness.

Human ear

Sound

- The sensation of sound is **only** produced within the minds of living creatures.
- A falling tree produces only fluctuations in air pressure, which are detected by our ears, which sends an electrical signal to our brain, and only then is a sound created.
- There was no Big BANG, just a big expansion!
- Therefore, the universe exists in total silence.



Human nose

Smell

- The sensation of smell is **only** produced within the minds of living creatures.
- Gases with a chemical composition that can be registered by receptors within the nasal cavity, cause an electrical message to be sent to the brain, which creates the sensation of either a good or bad odour.
- The answer to the question: *Who made that smell?* is always, YOU!
- Therefore, the universe exists without odours.

Quantum forces acting on our five senses

Spices

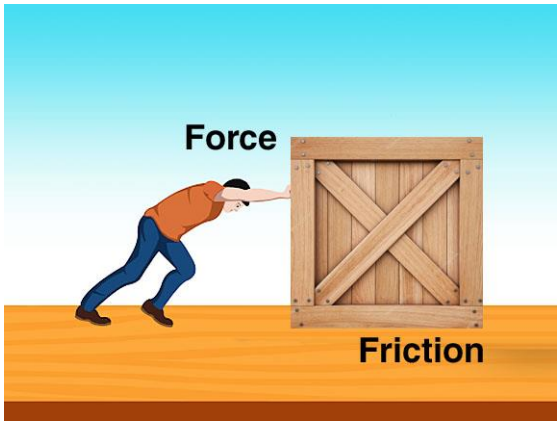
Taste

- The sensation of taste is **only** produced within the minds of living creatures.
- Taste is the perception produced, or stimulated, when a substance in the mouth reacts chemically with taste receptor cells located on taste buds in the oral cavity, mostly on the tongue.
- Humans can detect five taste modalities: sweetness, sourness, saltiness, bitterness, and savouriness.
- Therefore, the universe exists without taste (flavour).

Lava

Heat

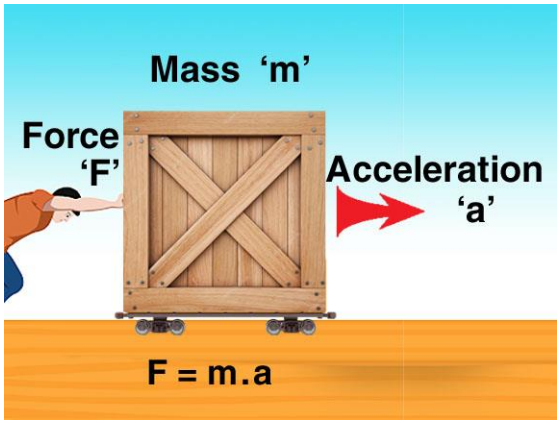
- Heat is a sensation that relates to the sensation of touch.
- Heat involves a transfer of energy, and sometimes a transfer of matter, which is just another form of energy.
- But ultimately, heat is made up solely of energy, which is made up of 'nothing' physical.
- Certainly, the feeling of heat is created in the brain, while the action of heat is a product of energy (actually forces).



A repelling or pushing force

Touch

- Objects that we have traditionally been referred to as 'matter' cannot touch each other at a molecular level.
- It is said that molecular repulsion prevents any direct contact from occurring.
- This means that you have never actually touched any physical matter.
- The sensation of touch is generated by repelling forces, which can cause a deflection in the touched and/or touching surface, but it is the brain that registers this touch.



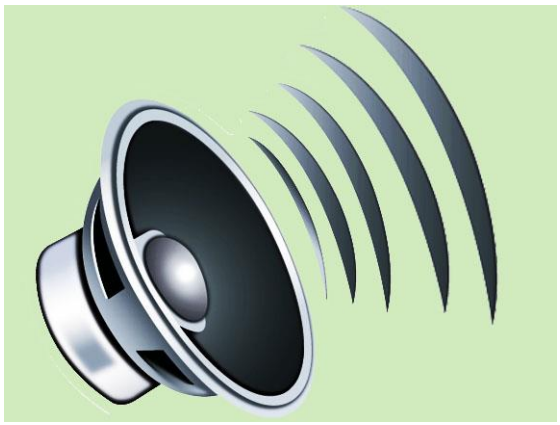
Force, mass and acceleration

Mass, inertia and momentum

- The effects of mass, inertia, and momentum are not created in the minds of humans, but instead exist in the reality of the universe.
- However, the effects of, or the perception of, mass, inertia and momentum, are generated by quantum forces, just as the perception of physical matter is generated by quantum forces.
- But, what is so magical about all of this is the fact that the force that creates inertia is the same force that creates gravity.

3. The Speed of Causality

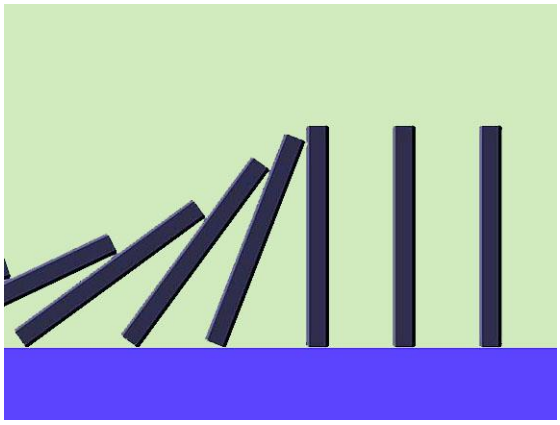
Introduction



Vibrating sound speaker

The speed of sound

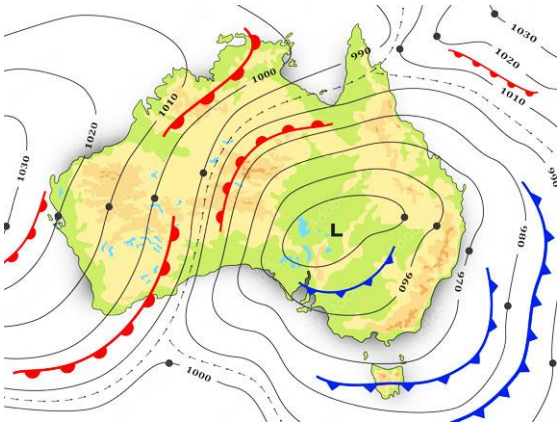
- The speed of sound is the speed of causality of the media through which the sound travels, such as 'air'.
- When a sound speaker vibrates, it causes the air adjacent the speaker to also vibrate, this vibration, or movement, does not occur at the speed of sound.
- These vibrations of the air create minor compression waves in the air, and it is these compression forces that move from air particle to air particle at the speed of sound.



Falling dominos

Falling dominos

- When a series of standing dominos fall, the speed of this action is the speed of causality of the dominos.
- The tumbling speed is independent of the speed that the first domino, which was pushed.
- The speed of the falling dominos depends on the mass of the dominos, and their spacing; but not on the speed of the initial trigger event.



Weather front

An energy wave travels at the speed of causality for the media

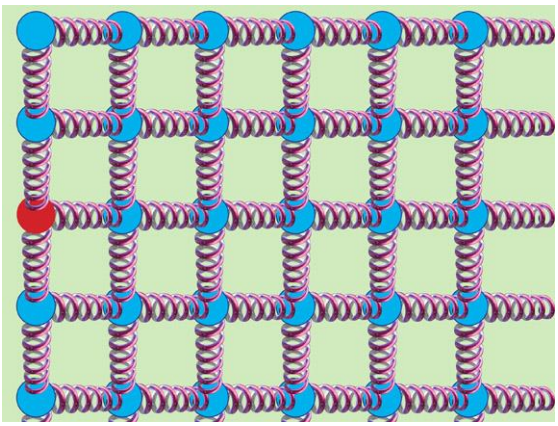
- An energy wave travels at the speed of causality of the media through which it travels.
- A particle wave, however, travels at the speed of the particles, which depends on the speed of the initial trigger event.
- For example, a sound wave travels at the speed of sound, while a weather front (which is also a pressure wave) travels at the speed of the weather front.

Speed detection

The speed of light

- The speed of light is the speed of causality of the media through which the light travels, which could be aether, air, water or glass.
- This means that the speed of light is not a constant, but actually depends on (i) the velocity of the media, and (ii) the density of the quantum forces.
- Thus the speed of light on Earth is affected by the speed of Earth's magnetic field, which travels with the Earth.

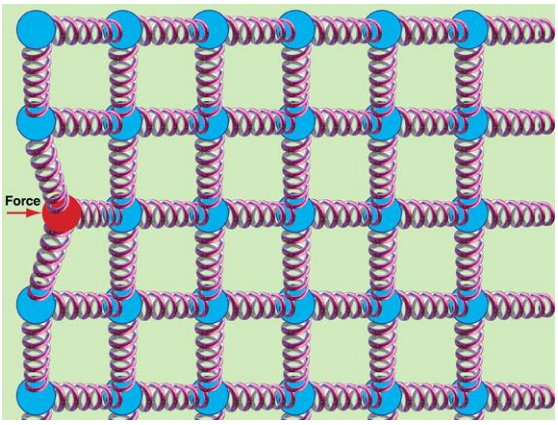
The speed of causality



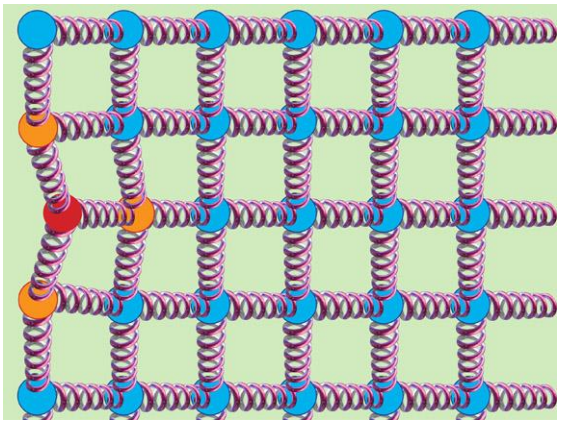
Energy field at rest

The speed of causality

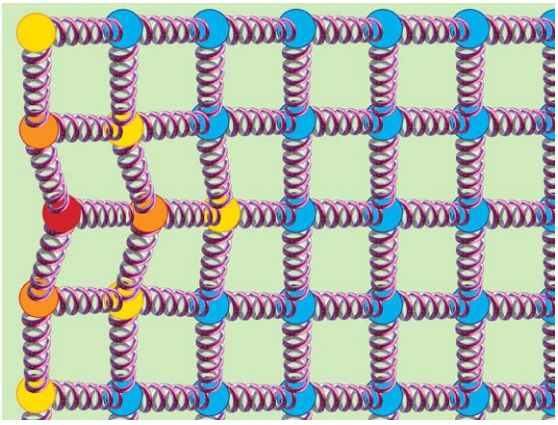
- The speed of causality is really the speed of an force message (or an energy message if you prefer).
- Light travels at the speed of causality, whether in space, air, glass or water.
- Imagine an energy field with springs acting as the forces.
- If you apply a force to one energy unit, then the speed of causality is the speed that this force travels through the energy field.



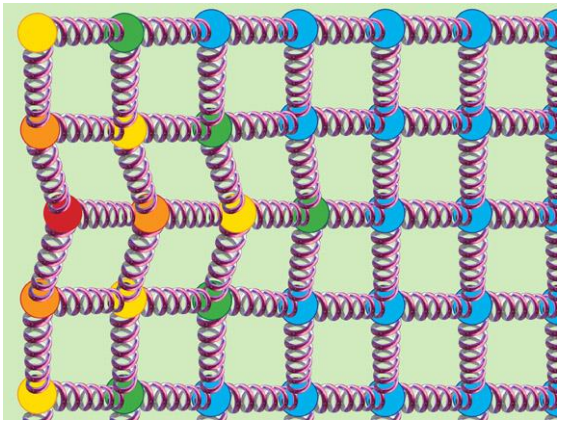
Force applied (t = zero)



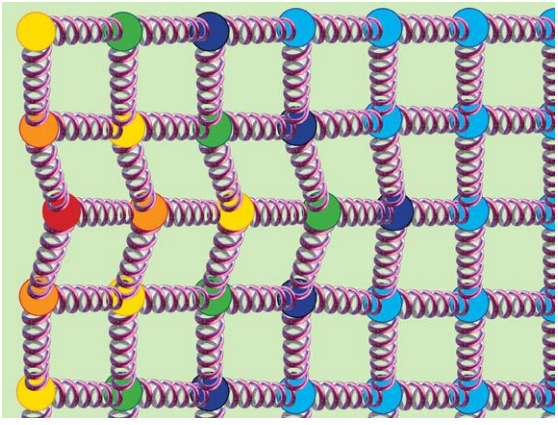
Time = Δt



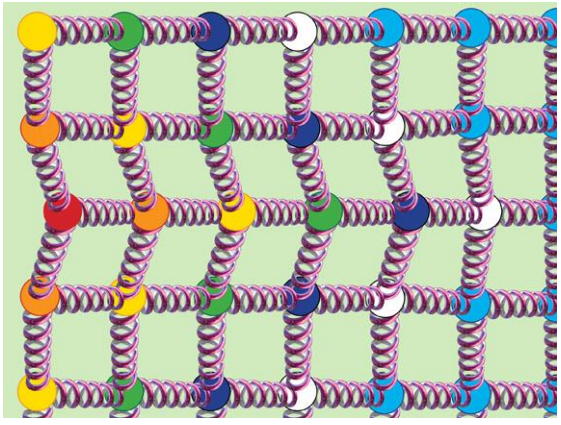
Time = 2Δt



Time = 3Δt



Time = 4Δt



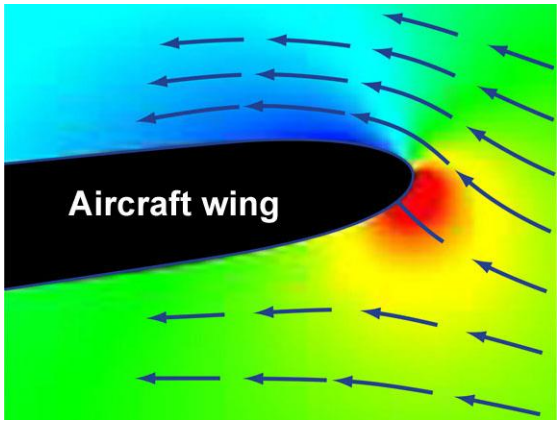
The domino effect

The concept of ‘critical velocity’

Water motion linked to critical velocity

Critical velocity in water flow

- The critical velocity of a fluid is the speed that an energy message, or a pressure wave (the same thing), can move through the fluid.
- In hydraulics, critical velocity is similar to the term speed of causality.
- The difference in how the terms are used is that a physical object can move through a fluid at speeds greater than the fluid’s critical velocity, but a pressure wave cannot move faster than the speed of causality.



Subsonic air flow

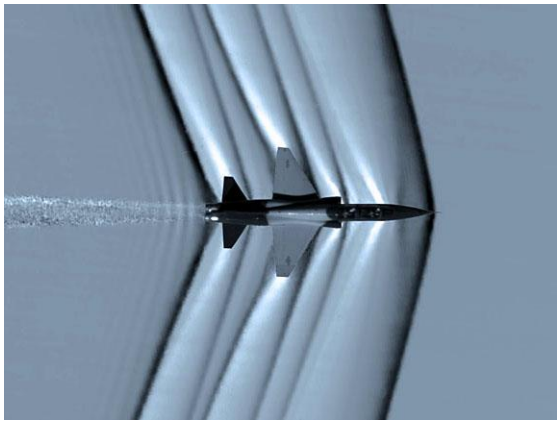
Moving slower than the critical velocity

- If a physical object moves through a fluid at a velocity that is lower than the fluid’s critical velocity, then the pressure wave created by this movement is able to move faster than the object.
- This means the fluid particles just ahead of the object will receive a pressure message telling them that something is moving towards them, and this pressure message begins to move the fluid particles out of the way of the approaching object.

Subsonic aircraft

Subsonic flight

- Even though a commercial jet travels at a very high speed, this speed is less than the critical velocity of the air.
- This means that the air just ahead of the aircraft will receive a pressure message telling it to start moving out of the way of the approaching aircraft.
- This means that subsonic aircraft can have a rather abrupt, but rounded nose, and still be ‘streamline’ (aerodynamic).

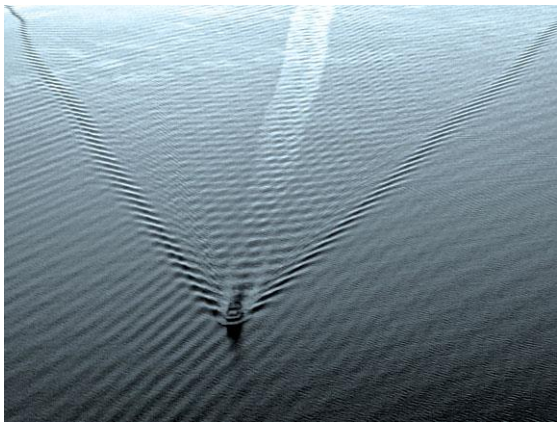


Supersonic flight and shock wave

Supersonic flight

- However, if a plane travels through air at a speed greater than the critical velocity of the air, then the air just ahead of the aircraft will NOT receive a pressure message telling it to get out of the way.
- The sudden arrival of the jet will come as a ‘shock’ to the air particles.
- This action creates a shock wave, caused by the compression of the air, and its subsequent sudden movement.

The concept of ‘critical velocity’



Speed boat wake

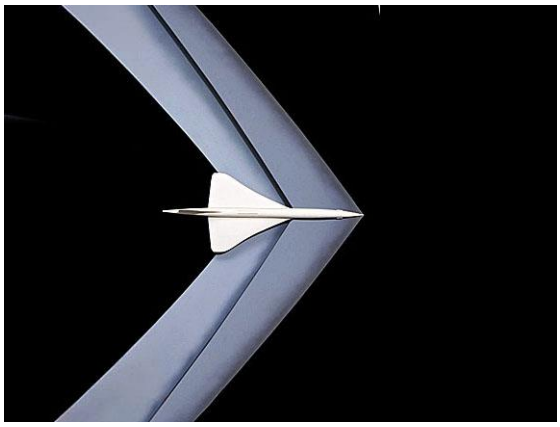
Critical velocity

- In hydraulics the term ‘critical velocity’ is used.
- In aerodynamics the term ‘speed of sound’ is used to define this critical velocity.
- In astrophysics, the term ‘speed of causality’ is used.
- A boat’s wake is partially created by the shock waves generated by the boat moving across the water at a speed greater that the water’s critical velocity.

Shock lines on supercritical flow

Critical velocity and shock waves in water

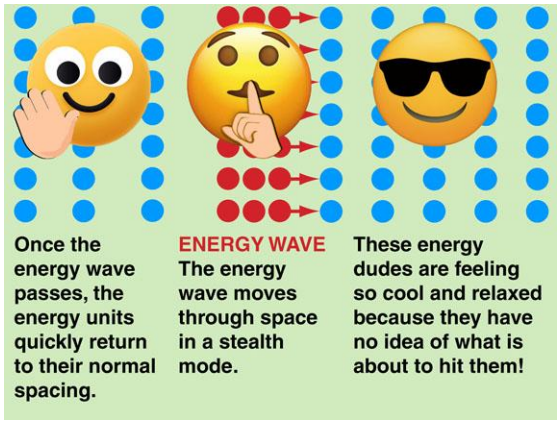
- Hydraulic messages move through water as pressure waves, which can normally be observed by a rise and fall in the water surface, i.e. as waves.
- When the water velocity exceeds the critical velocity, the water stops feeling the effects of the downstream water level.
- If water flows faster than its critical velocity, then these pressure messages are swept downstream forming angular waves (left) on the water surface.



Sound-based shock wave

Critical velocity and shock waves in air

- If an aircraft accelerates through the sound barrier (i.e. the speed of a sound wave in air), a shock wave is formed.
- This shock wave travels with the plane because it is constantly being generated by the plane.
- The shock wave will trail behind the plane in a V-shape if the plane is travelling faster than the shock (sound) wave, and the angle of this shock wave becomes more acute as the plane’s speed increases.

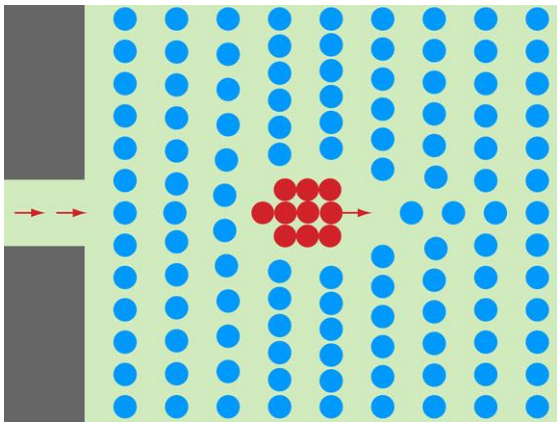


A travelling energy wave

Critical velocity in an energy field

- Energy sends a message through a field of energy by compressing the density of the media (much like sound waves).
- Alternatively we can say that quantum forces are able to transfer a force message by compressing the density of the preceding quantum forces.
- This compressed force travels at the speed of causality, which means it arrives as a ‘shock’ to the preceding quantum forces.

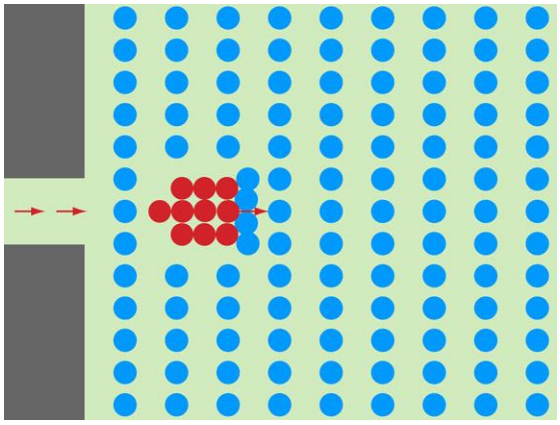
Properties of subcritical velocity and critical velocity



Subcritical movement of a particle

Subcritical movement

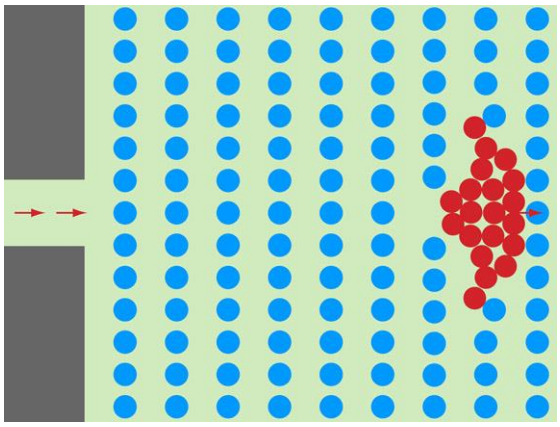
- Planets and stars (i.e. particles) move through space at a relatively low velocity compared to the speed of light.
- This subcritical movement allows the energy field (space) to receive energy messages about the planetary movement in advance of the planet's arrival.
- A field of quantum forces behave like a superfluid, which means it moves out of the way of approaching objects with no friction or turbulence.



Initial virtual movement of a photon

Critical velocity

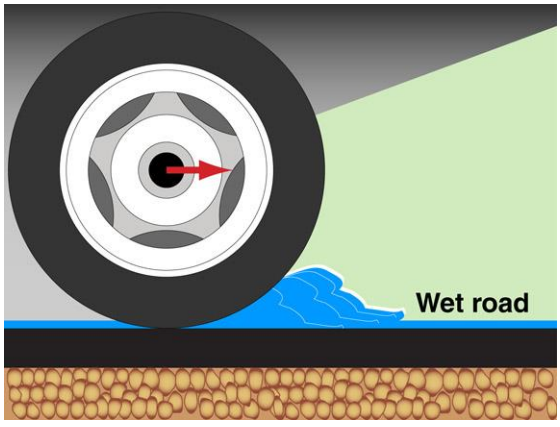
- If an object were to travel at the speed of light (i.e. the speed of causality), then the quantum forces in front of the object would not begin to move until they were actually hit by the advancing object.
- At this velocity, the quantum forces in front of the object will be forced to compress rather than move out of the way, which forms a shock wave.
- This action will occur independent of the object being a physical particle, or a virtual particle (like a photon).



Development of an energy shock wave

The growth of the shock wave

- As the object travels, the shock wave grows, and moves with the object (both are travelling at the speed of causality).
- The shock (compression) wave will expand in three-dimensions, and its growth will extract energy from the object.
- If the object is a photon, then the photon provides this energy input.
- For a photon, the energy level will vary across the shock wave, which produces the various colours that make-up white light.

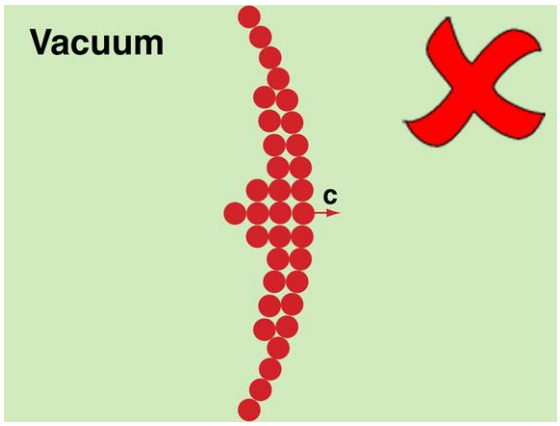


Car tyre on a wet road

Not like a snowplough

- A shock wave does not act like a snowplough, collecting more and more snow as it moves.
- A better comparison would be a car tyre rolling over a wet road, but only because water acts as a fluid, while snow does not.
- Another comparison would be a sand storm picking up new sand as it moves, but also releasing sand from behind the sand storm, which allows this sand to return to its normal state of rest (or aether, as the case may be).

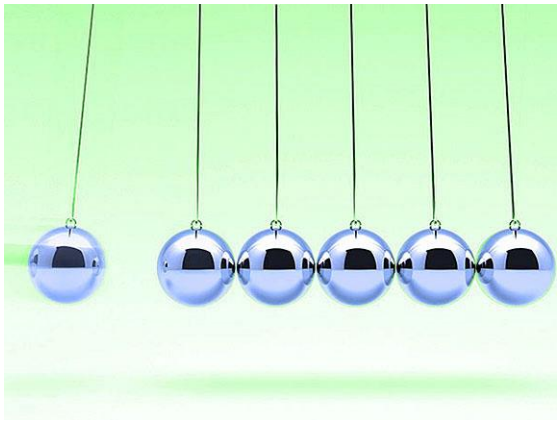
The potential for light to travel at different speeds



Not able to travel through a vacuum

Light cannot travel through a vacuum

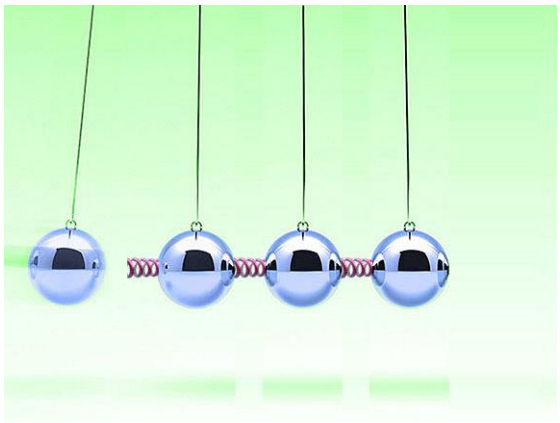
- A photon is a compression of quantum forces (or energy, if you prefer).
- But, a photon is not a 'package' of energy (i.e. not a physical particle); instead, a photon is a compression of energy—just like sound is a compression of air.
- Being 'an energy message', a photon can only move through a field of energy.
- Alternatively you can say that a photon can move through a field of quantum forces, or a field of aether, but not a vacuum.



Newton's cradle

The mechanics of causality

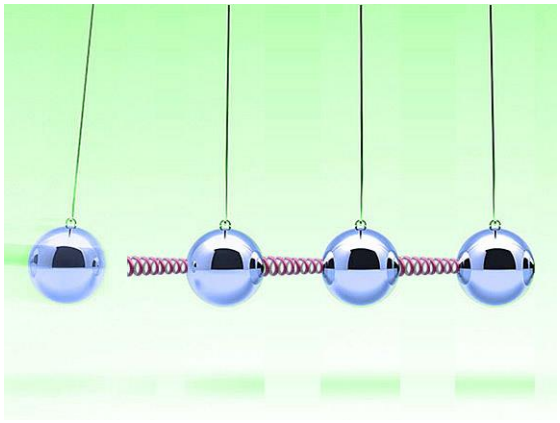
- Causality is the relationship between 'cause' and 'effect'.
- It is a measure of how quickly a force can cause an action.
- Consider Newton's cradle, in this case the speed of causality is related to the elastic properties of the metal spheres, which is a function of their molecular properties.



Newton's cradle with short springs

Modifying the speed of causality

- Now consider the outcome of Newton's cradle if small springs were placed between each sphere.
- The reaction time would be slower, meaning the speed of causality would be slower.
- Yes, the cradle will no longer work properly because there will be a pronounced secondary effect due to the energy retained in the springs.

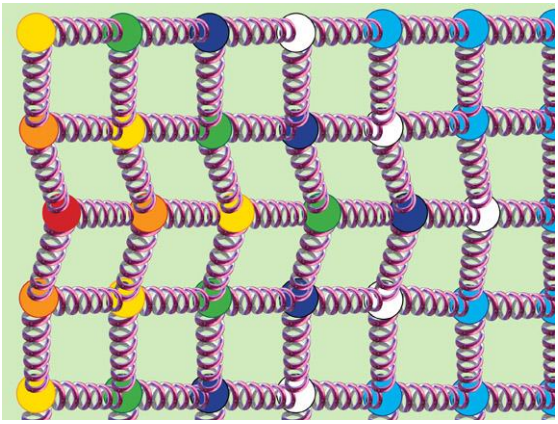


Newton's cradle with longer springs

Further modifications

- If we change the spring rating, or the distance between each sphere, then the speed of causality will again change.
- Well, the movement of light is just a mechanical process, and like any other mechanical process, if you change the mechanics, you are likely to change the outcome.
- In the case of 'light', the mechanics of the system will change if the universe expands, or if the density of free energy changes from one media to another.

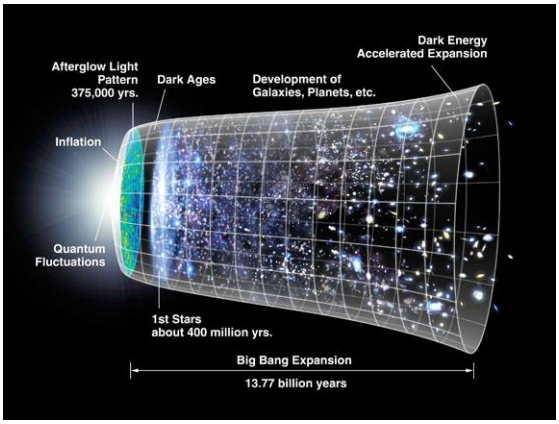
The potential for light to travel at different speeds



'Effects' passing through a energy grid

Variations across space

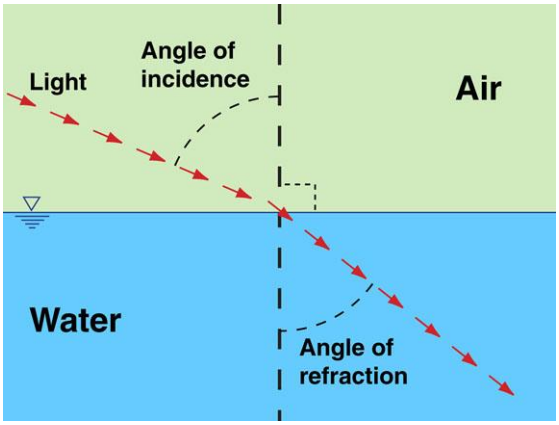
- If the speed of light is governed by the speed of causality in space, then:
  - a constant speed of light would require a uniform distribution of energy units (free energy) across space
  - however, a uniform distribution of energy is unlikely to exist because the effects of an expanding universe can only travel across the universe at the speed of causality
  - thus the speed of causality must vary across space.



Inflation—caused by rapid speed of causality

Expanding universe

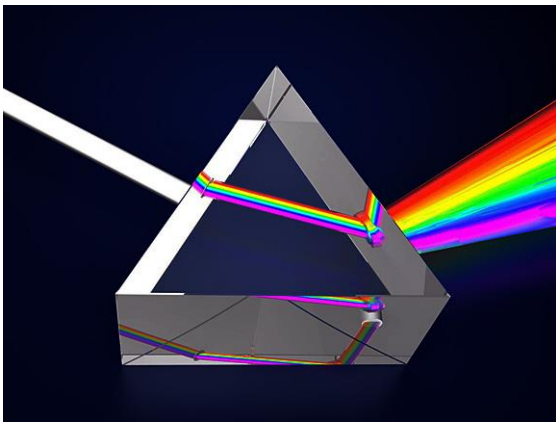
- If the speed of causality does change in response to changes to the quantum forces (or energy), and if we accept that space is constantly expanding, then . . .
- It would seem logical that the speed of causality would:
  - vary across space at any given time
  - vary with the density of free energy (or free quantum forces)
  - would slow as space expands
  - would be slowest at the edge of space.



Light entering water

Light passing through water

- When light enters water, the speed of causality changes because:
  - the energy message (or forces) that forms a photon, can only transfer its energy message through a field of free energy, and
  - the concentration of free energy (or free quantum forces) is reduced because of the density of concentrated energy that forms the physical matter of water
  - which slows the energy message.

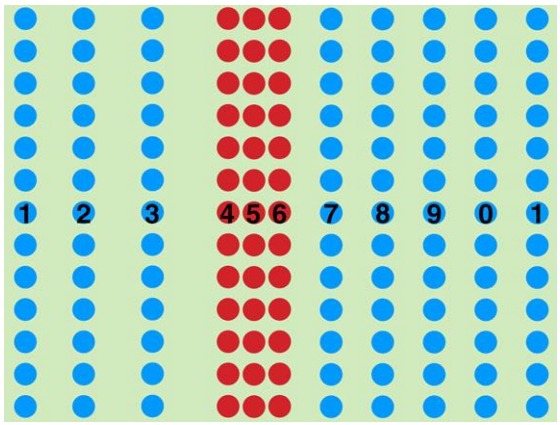


Light passing through glass

Light passing through glass

- As the density of the physical matter increases:
  - the density of non-matter (free energy) decreases
  - the required communication time between energy units increases
  - causing the response time of the free energy to slow
  - causing the speed of causality to slow.
- Similar to the speed of sound.

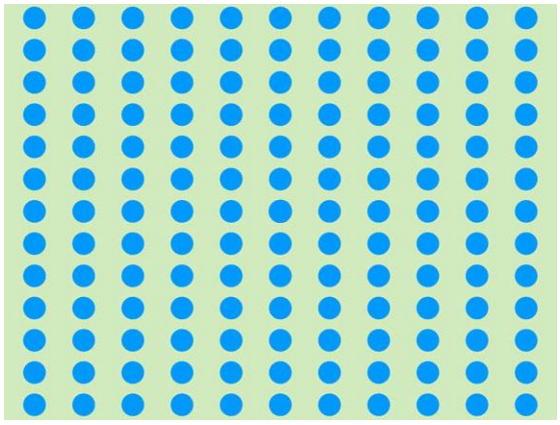
The consequences of light approaching the edge of space



Photon compression wave

Light exists as compression wave of quantum forces (or energy)

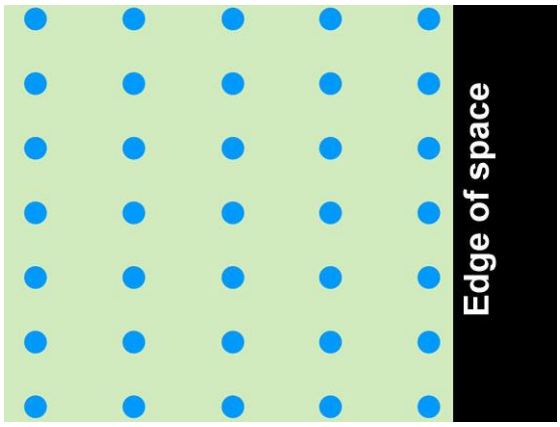
- Because light travels as a compression wave of quantum forces, it cannot travel beyond the existence of quantum forces.
- This means that the universe is <u>not</u> expanding at the speed of light.
- On the other hand, if photons travelled as physical particles, then it would be reasonable to expect that photons could travel beyond the edge of space, thus creating more space, and thus more universe.



Non-concentrated (free) quantum forces

Photons collapse at the edge of space

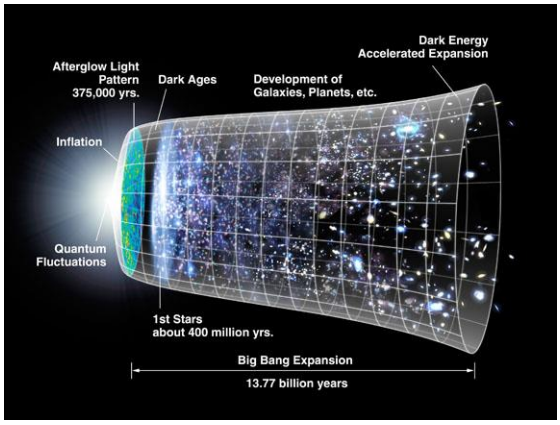
- If we accept that light travels as a compression wave of quantum forces; then as a photon approaches the edge of space:
  - the quantum forces approach zero
  - free quantum forces can no longer hold a photon in a stable condition
  - the compression wave of quantum forces (i.e. the photon) collapses
  - the photon returns to a condition of non-concentrated quantum forces (i.e. aether).



Edge of space

Photons travel slower at the edge of space

- The speed of a photon is governed by the reaction time of quantum forces, and it is likely that the reaction time of quantum forces would reduce as the spacing of quantum forces increases.
- It is also likely that the density of quantum forces reduces from the centre of the universe to the edge of space, and as time passes.
- Meaning that the speed of light is likely to reduce towards the edge of space, and with the passing of time.



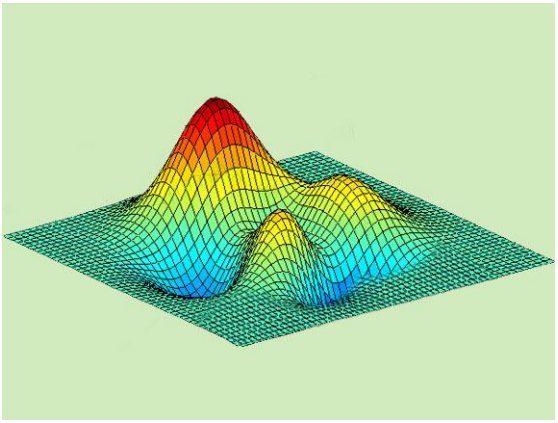
Proposed expansion of space?

Objects appear to travel faster at the edge of space

- If we measure distances in space in terms of light-years, and:
  - if we determine the distance light travels in a year based solely on the speed of light as measured on Earth in the 21st century, then
  - we will overestimate the travel distance of a light-year at the edge of space
  - which means we will overestimate the rate of expansion of the universe.

4. Light is not a Particle

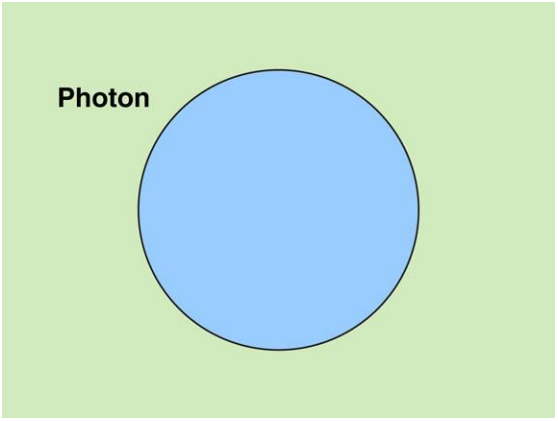
Introduction



A concentration of energy or forces

What is a particle?

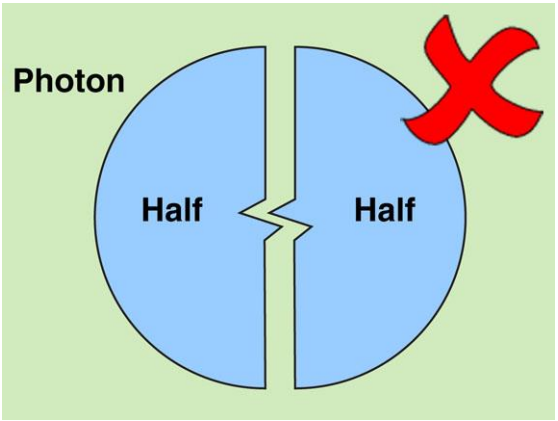
- If we accept that a particle is a concentration of quantum forces.
- And we accept that a water wave is a body of water shaped like a wave.
- And we accept that for ocean waves, the water does not travel with the wave, just as the rope fibres do not travel with a wave passing along a tort rope.
- Then we can introduce the terms, virtual particle and virtual wave, to represent those particles and waves where the media does not move with the object.



Photon

If light were a physical particle (?)

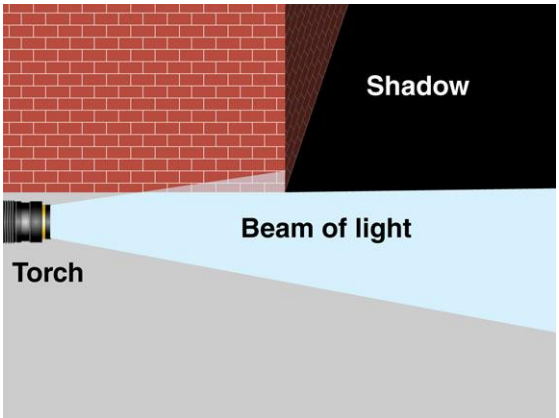
- If light travelled as a massless physical particle, then it would be reasonable to suggest that:
  - light would generate waves while moving through a media, but
  - light would not generate waves while moving through a vacuum.
- This means the double slit experiment would produce different results if performed in a vacuum (but where could we find a true vacuum?).



Dividing a single photon

Reasons that could be used to support the idea that a photon exists as a physical particle (?)

- The reasons and/or observations that could be used to support the idea that a photon is a physical particle include:
  1. Only a physical particle can pass through a vacuum, which is believed (by some) to exist across space between objects of matter.
  2. Only a physical particle could allow the existence of a half-photon (but tests suggest a half-photon cannot exist).
  3. Physical particles are considered to be less likely to experience diffraction around sharp corners compared to virtual particles.
  4. An isolated photon can be released from a laser, and then detected at a signal location on a detector plate, suggesting that a photon moves as a 'package'.
- Each of these issues will be addressed over the following pages.



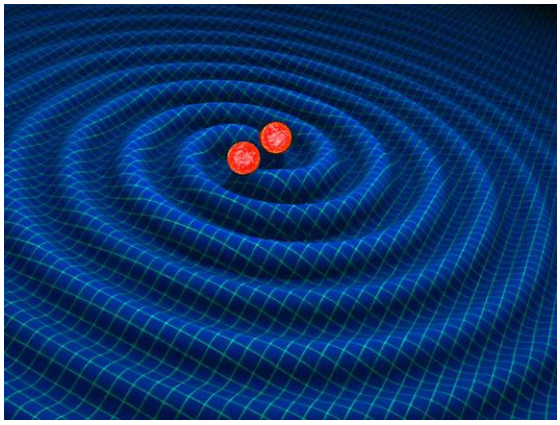
Minimal diffraction of light

Issue 1: A photon passing through a vacuum

Empty space

Issue 1 – Passing through a vacuum

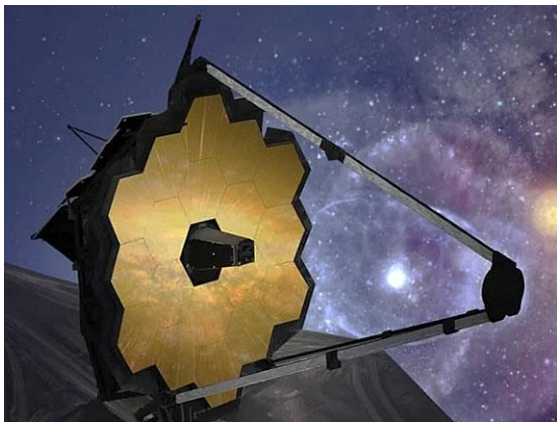
- If a true vacuum did exist in space, then an energy wave, or any form of wave, could not pass through that region of space.
- You simply cannot transfer energy through something that is no there.
- If space contains large regions that are true vacuums, then that would strongly support the idea that light travels as a virtual particle, not a physical particle.



Gravitational waves

Does a true vacuum exist in space?

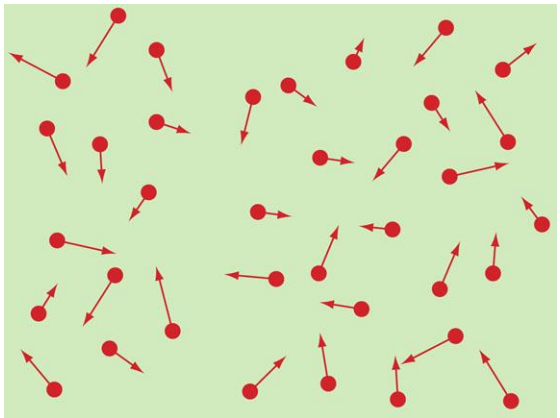
- It does not seem logical that space (i.e. the universe), would contain a true vacuum for the following reasons:
  - the detection of gravity waves indicates that space is a continuous media without vacuous zones
  - the Michelson–Morley experiment failed to demonstrate the existence, or non-existence, of an aether effect
  - there is no location in space where photons do not travel.



James Webb Space Telescope

James Webb space telescope

- If you were to transport the James Webb telescope to any location in space, then it is likely that the telescope would be able to identify billions of stars.
- If a billion stars can be detected by the telescope, then that means a billion stars are sending information (photons) to that location, on a continuous basis.
- If you moved the telescope just 1 mm in any direction, the same stars would be sending photons to that location—so how could any spot in space by 'empty'?

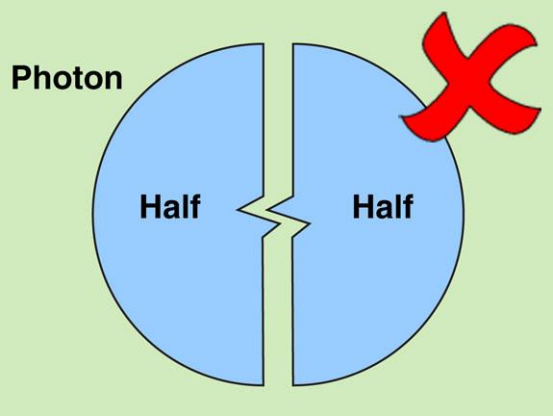


Quantum forces

Quantum forces

- One of the benefits of adopting a force-filled universe, instead of an energy-filled universe, is that it is easier to accept the idea that:
  - quantum forces have no physical existence
  - quantum forces cannot be detected
  - quantum forces would form part of the expected mass of the universe
  - it is reasonable to assume that quantum forces form a continuous media.

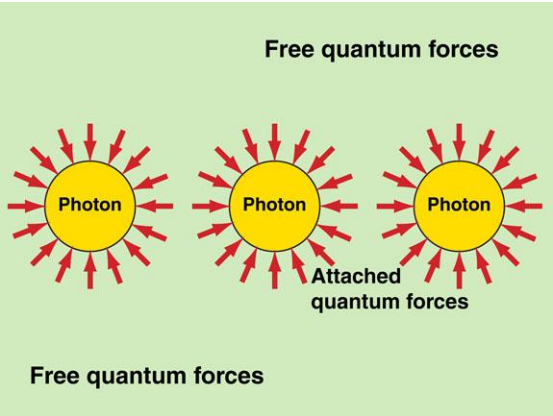
Issue 2: A half photon cannot exist



Dividing a single photon

Issue 2 – Splitting a photon

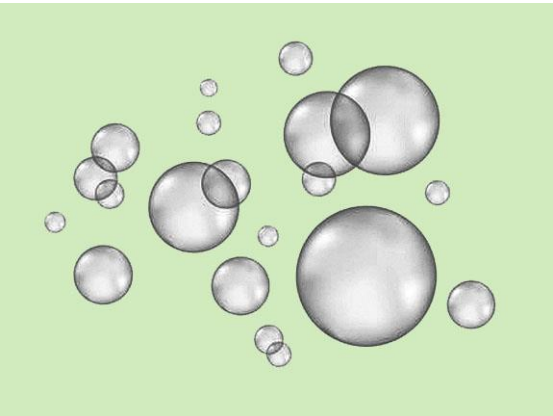
- Experiments appear to demonstrate that it is not possible for a single photon to be divided.
- To be honest, I have not spent much time researching these experiments, or understanding the concepts involved, but the premise seem logical.



Forces on a photon

The forces acting on a concentration of quantum forces

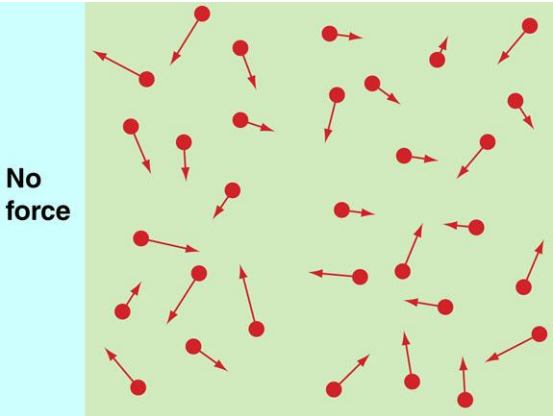
- In the final chapter of this paper, I describe how free quantum forces apply forces to a concentration of quantum forces.
- It would appear that quantum forces have just two stable conditions:
  - evenly spaced, ever expanding, and in constant 'contact' with the surrounding quantum forces (free quantum forces)
  - concentrated quantum forces surrounded by free quantum forces.



Gas bubbles in a fluid

Stability of concentrated quantum forces

- So, if quantum forces have just one task, that being to repel all other quantum forces, then how can a concentration of quantum forces be stable.
- I would ask you think about a concentration of quantum forces as being similar to a bubble of gas in a glass of sparkling water:
  - the bubbles of gas may be pressurised
  - but, the surrounding water pressure is able to stabilise this pressure.

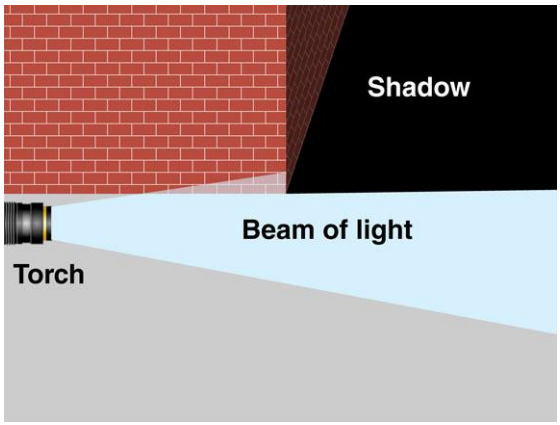


Edge of space

Collapse of a half photon

- When light reaches the edge of space, it no longer has the stabilising pressure of the surrounding free quantum forces, so the photon simply collapses into non-concentrated quantum forces (i.e. aether).
- It would appear that there must be a minimum concentration of quantum forces that is required to generate the necessary stabilising forces from the surrounding free quantum forces; otherwise, the concentration will collapse and disperse as free quantum forces.

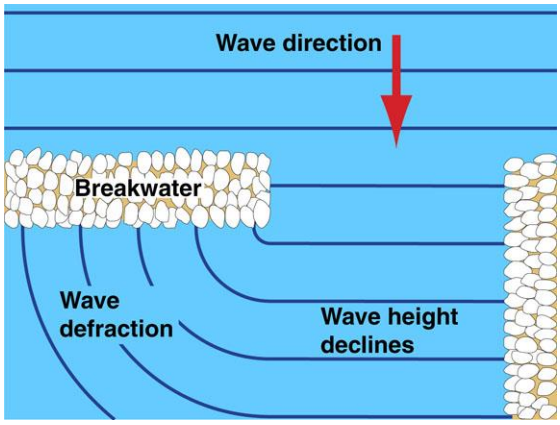
Issue 3: Diffraction around sharp corners (the creation of shadows)



Minimal diffraction of light

Issue 3 – Diffraction of light

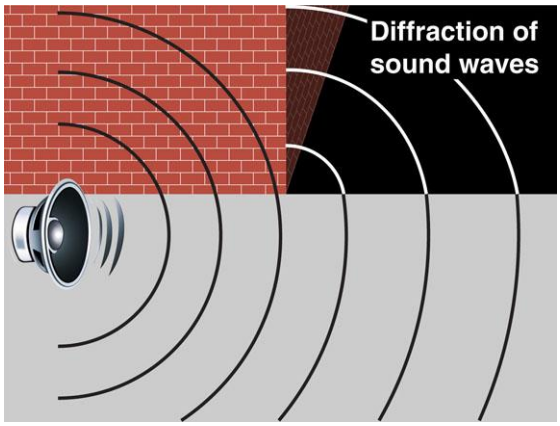
- This issue is based around the idea that light does not diffract around the edges of objects to the same degree as say, sound waves.
- The initial suggestion being that light does not diffract at all—thus it must be a particle.
- However, the current belief is that light does diffract to a very small degree, which supports, but does not confirm, the concept of light being a particle.



Wave diffraction

Diffraction of water waves

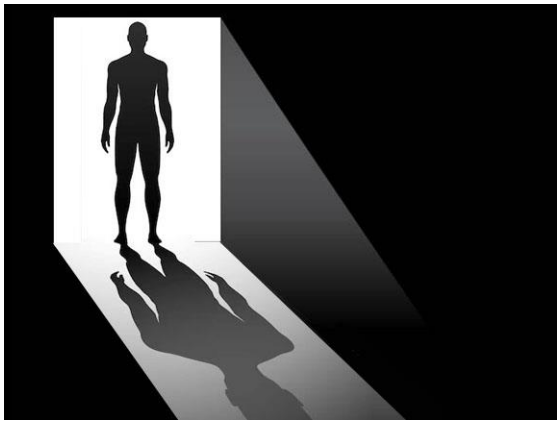
- Water waves are primarily powered by water pressure.
- This water pressure radiates in all directions.
- When a water wave passes a solid object, the water pressure that was being imparted onto that object, now spreads laterally around the edge of the object, which causes an almost instantaneous diffraction of the transverse water wave.



Diffraction of sound waves

Diffraction of sound waves

- Sound waves are primarily powered by air pressure.
- This air pressure radiates in all directions.
- When a sound wave passes a solid object, the air pressure that was being imparted onto the object, now spreads laterally around the edge of the object, which causes an almost instantaneous diffraction of the longitudinal pressure wave.

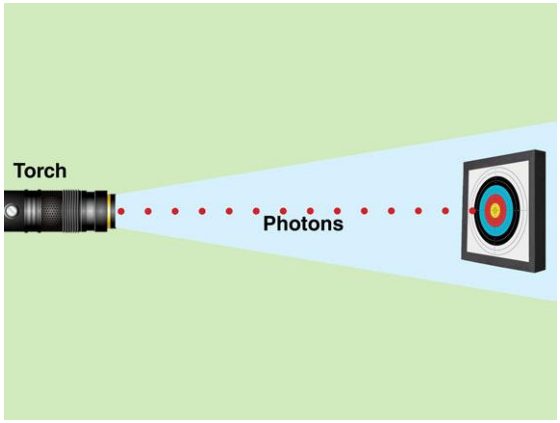


The creation of sharp shadows

Diffraction of light

- The movement of photons is primarily powered by quantum forces.
- These forces radiate in all directions, but are repelled by the free quantum forces that surround the photon.
- When a photon passes a solid object, the 'shock wave' generated by the photon can expand slightly into the open space.
- However, the photon cannot expand due to the stabilising forces of the surrounding free quantum forces—thus a photon does not have to be a physical particle.

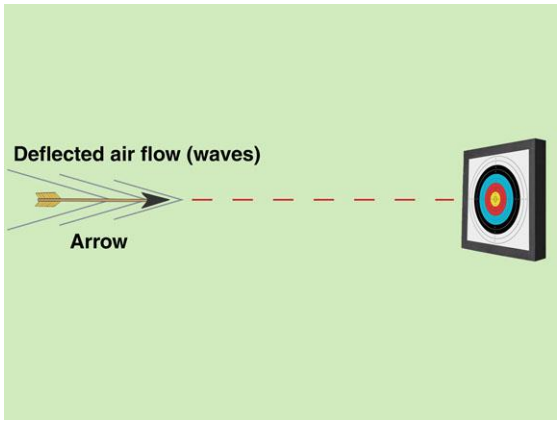
Issue 4: Generating and detecting a single photon



Travel of a single photon

Issue 4 – Detecting a single photon

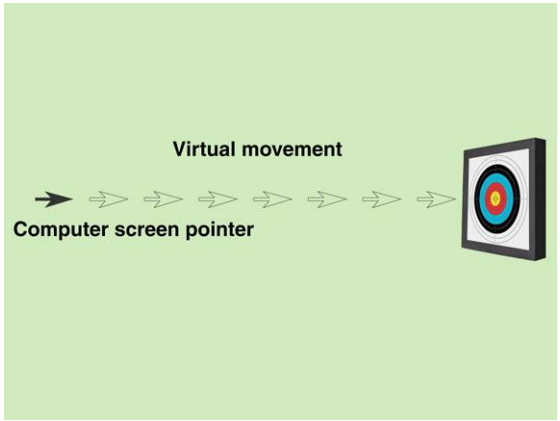
- The issue here is that a single photon can be generated, sent on its way, and then detected as a single object on a light detector, thus suggesting that the photon is a particle.
- The question being: If light travelled only as a wave, then why does it arrive at its final destination as a point source (point impact)?



Travel of an arrow

Creating waves

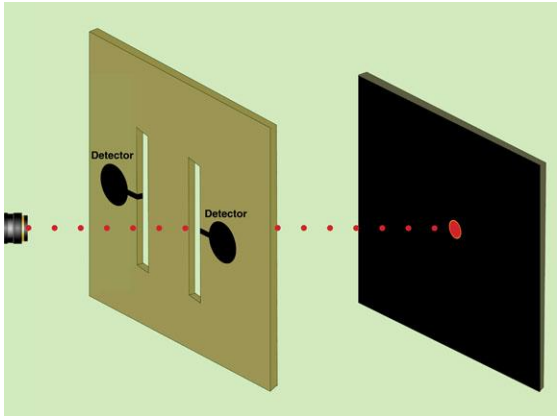
- The fact is, any physical particle can create waves as it travels, but still arrive at its destination as a single particle.
- However, a virtual particle, in the form of an energy wave, which causes a transient concentration of quantum forces, can:
  - also appear to be generated as a single photon
  - can generate waves as it travels
  - can arrive as a stable concentration of quantum forces, appearing to be a single particle.



Travel of a computer screen pointer

Computer screen pointer

- A computer screen pointer can be:
  - generated on the left-hand side of your computer screen
  - moved through virtual motion to the right-hand side of your screen, and yet
  - be observed by your eyes as retaining its original shape.
- But this does <u>not</u> make the pointer a physical particle.

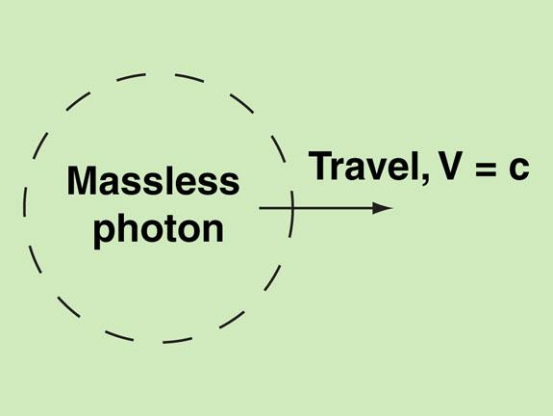


Projection of single photons

The detection of a single photon

- I have no idea how photon detection equipment works, but I assume that the sensitivity of any type of instrument would need to be adjusted such that it is able to detect the energy from a single photon.
- This means, there could be a shock wave surrounding the photon; however, the instrument is calibrated in a manner that would not allow the detection of this much weaker shock wave.

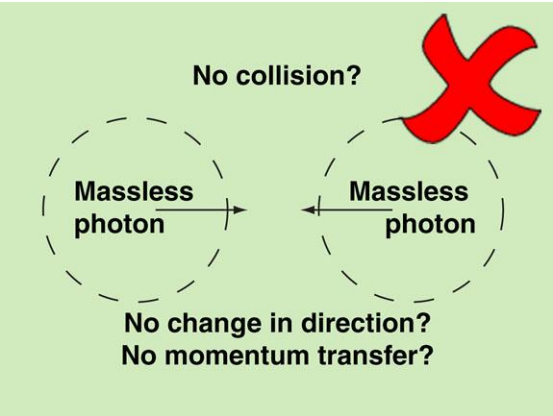
Further proof that photons do not exist as physical particles



A 'massless' particle ???

A photon is said to be a massless particle

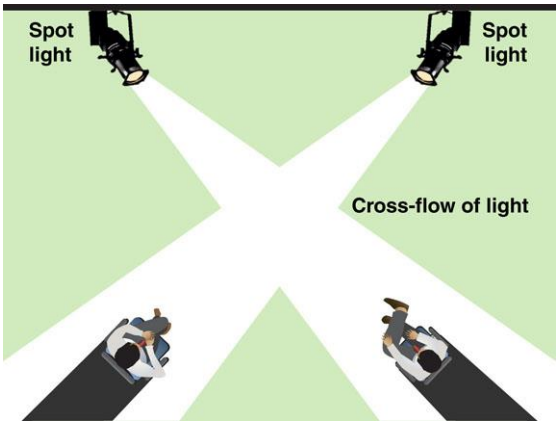
- It seem logical that if a photon were to be a physical particle, then it would need to be massless, otherwise we would feel more that the heat of the Sun hitting us.
- The real reason why a photon should be considered massless is because it is a virtual particle, not a real particle, just like an ocean wave is a massless virtual wave.



No impact? No deflection?

A photon is said to be able to impart momentum on matter, but not on itself

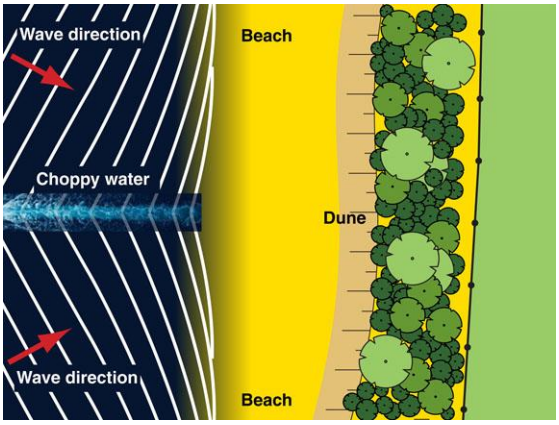
- Based on my very, very limited understanding of the currently accepted properties of photons, I believe that science states that a photon:
  - can transfer momentum to physical matter, but
  - it cannot transfer momentum to another photon.
- This outcome would agree with the idea that a photon is a virtual particle.



Cross flow of light beams

A beam of light can cross another beam of light (i.e. move past the point of intersection) without experiencing a change of momentum or direction

- Two beams of light (spot lights) can cross paths without a change in momentum or direction.
- This suggests that light travels as an energy wave, and not as a particle wave.
- This means that 'light' shares some common properties with sound waves and deep water ocean waves.

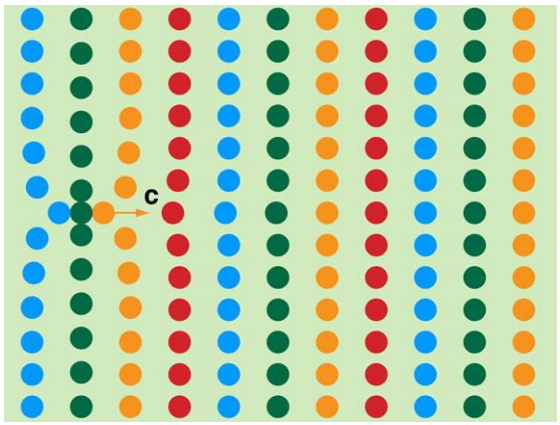


The 'collision' of two broken waves

A particle wave cannot experience constructive or destructive interference

- The double slit experiment proves that light travels as an energy wave, because a particle wave cannot experience constructive or destructive interference.
- This means that no matter travels with the light, or as light; instead, light is an energy message being transferred through an energy field.
- Light represents a compression of energy that transfers its energy message from energy unit to energy unit.

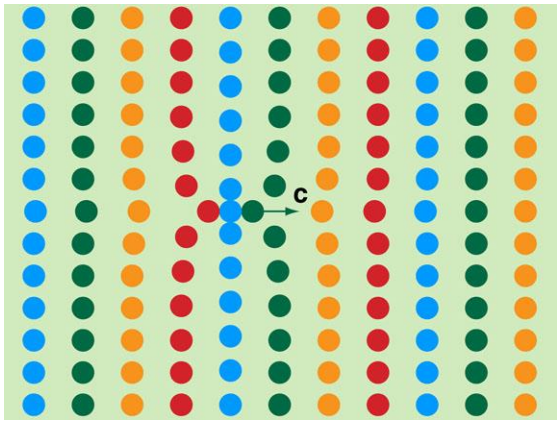
Physical particles and virtual particles



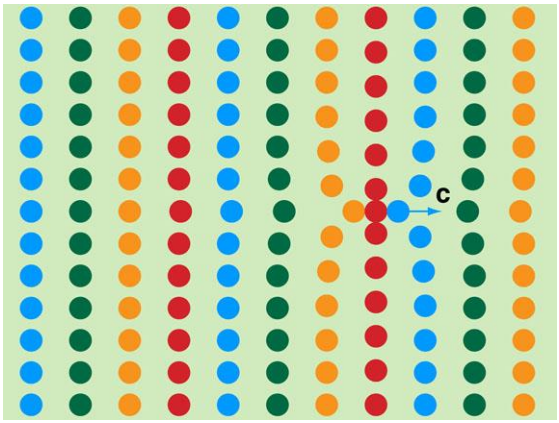
Virtual movement of energy

Virtual movement

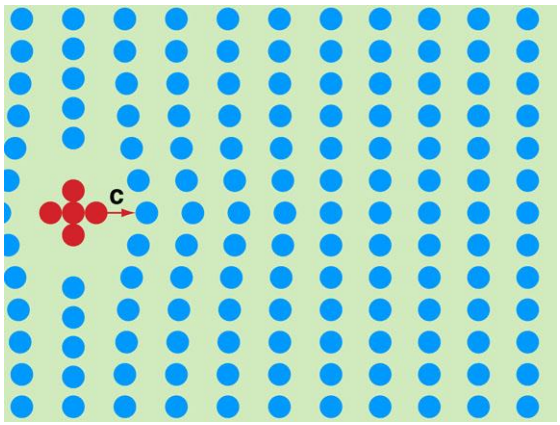
- It is difficult to demonstrate the difference between virtual movement and particle movement using still images, but these images are the best I can do.
- Virtual movement can consist of:
  - the transfer of energy, by a force, from energy unit to energy unit (e.g. light)
  - the appearance of movement via the incremental movement of a virtual object (e.g. screen pointer)
  - stop-motion image flipping (e.g. movie).



Movement to the blue column



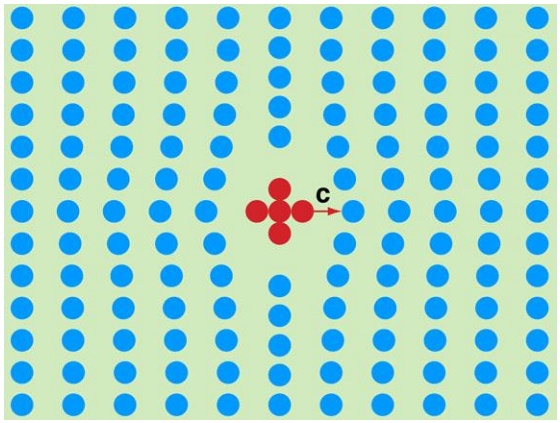
Movement to the green column



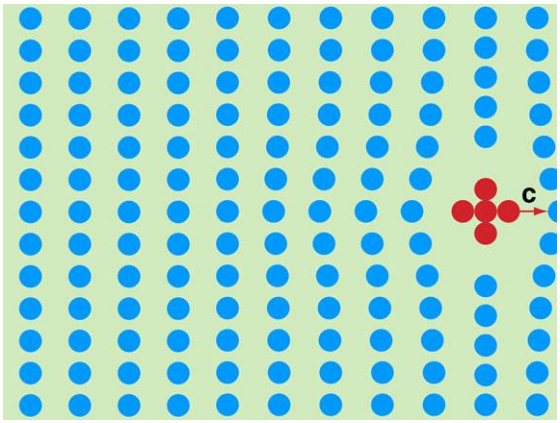
Particle movement

Particle movement (physical movement)

- Particle movement can also be termed physical movement because the particles physically move through a medium.
- If light moved as a particle, then light would have mass, and it would not be able to travel at the speed of causality.
- Light is not a particle, the same as an ocean wave is not a specific group of particles; it is an energy message, which displays virtual movement, allowing it to appear to travel as a massless particle.

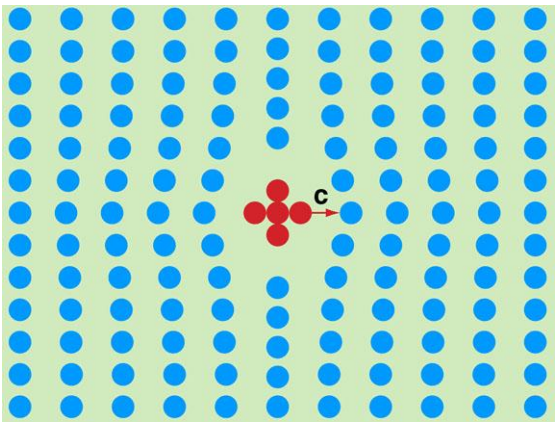


Particle pushes energy units away



Particle content stays together

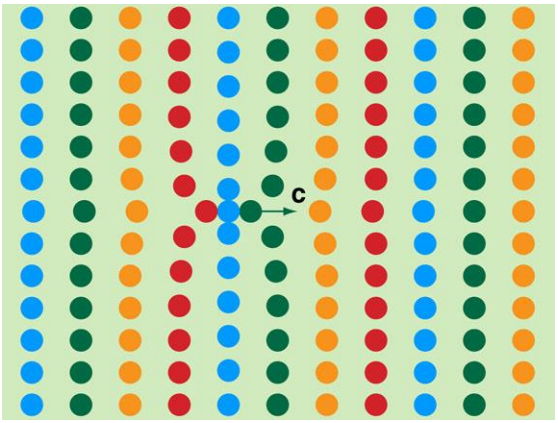
Light travels as a virtual particle



Movement of a physical particle

If a photon were a 'physical' particle (?)

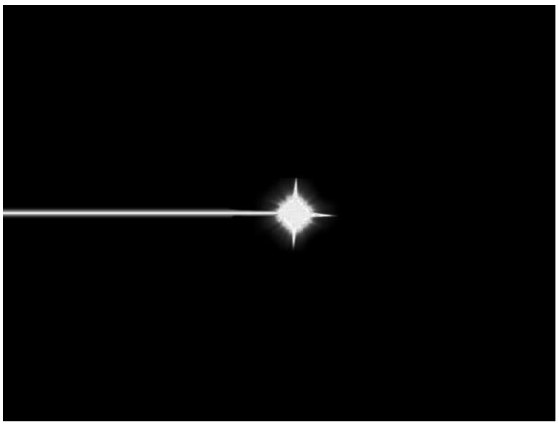
- If we were to accept that a photon of light is a 'package' of concentrated quantum forces existing within a field of non-concentrated quantum forces, then:
  - we must accept that this package of quantum forces moves with the photon
  - and that this package of quantum forces moves at the speed of light.
- However, this idea is asking us to believe that a photon can transfer momentum to matter, but not to another photon!



Movement of a virtual particle

If a photon were a 'virtual' particle

- On the other hand, if we consider a photon of light to be just a transfer of energy, then:
  - we can consider that the quantum forces that form the photon at any instant in time, do not move with the photon
  - the photon exists only as a virtual object (like a computer screen pointer)
  - it is only the transfer of energy that travels at the speed of light.



Photon

How can a photon impart a force on matter, or transfer energy?

- A virtual particle is a force without mass.
- A physical particle is a force with mass.
- Light can deliver a force because light is a force without a mass.
- If light is stopped from moving, then it becomes neither a force, nor a mass, so it returns to being aether, and the force that it carried turns into an action.

Class room explanations

We can keep calling a photon a 'particle'

- A photon may not technically be a particle, but we can choose to keep calling it a particle because it makes it easier to explain the science.
- After all, many of those out there that believe gravity is not a force, are willing to use the expression; *'The force of gravity'.*
- And, most people say the Moon orbits the Earth, instead of it orbiting the centre of mass, simply because these words are easier for growing minds to accept.

5. Is Light a Wave?

Introduction

Rope wave

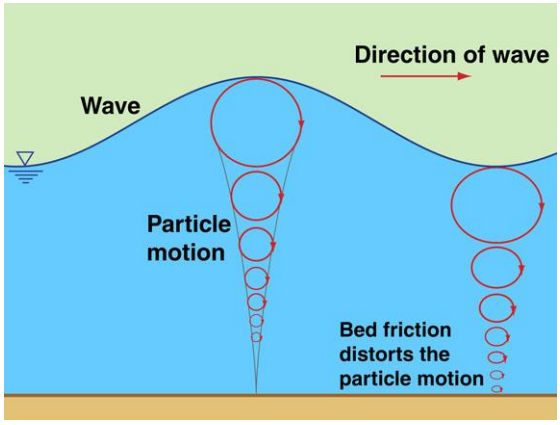
What is a wave?

- The Macquarie Dictionary defines a wave as:
  - disturbance of the surface of a liquid body
  - any surging or progressing movement
  - a swell, surge or rush, as of feeling, excitement, prosperity
  - a widespread movement
  - one of a succession of movements
  - a progressive vibrational disturbance
  - the act of waving (and so on).

Hand wave

Can something travel as a wave, but not itself, be a wave?

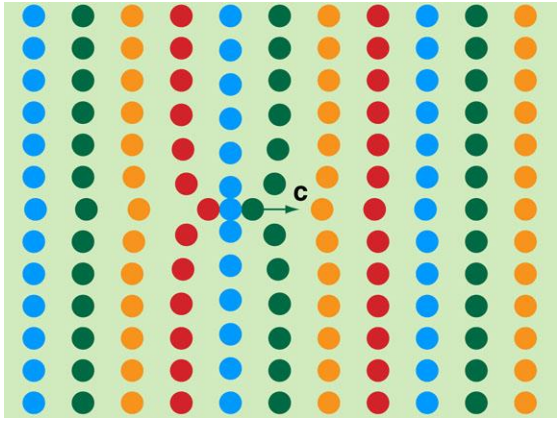
- You can have a wave of emotions, but an emotion is not a wave.
- You can wave a hand, but a hand is not a wave.
- And a wave of hair may consist of actual hair, but this type of wave does not require any movement
- A water wave, on the other hand, can consist of an actual moving wave, a non-moving wave, or a virtual wave.



Particle motion inside an ocean wave

Is a water wave a true wave if the water does not move with the wave?

- When a coastal wave breaks near a beach, the water that forms the wave will move with the wave towards the beach.
- However, for a deep water ocean wave, the water is only a temporary companion of the wave—the wave continues to move along its path, while leaving the water behind (the energy moves, not the water).
- But we still call an ocean wave, a ‘wave’.

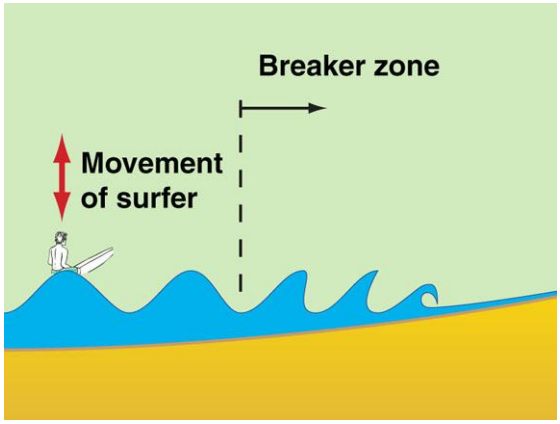


Movement of a virtual particle

Is a photon a wave if the media that forms the photon, does not move with the photon?

- The characteristics of a photon are very similar to sound waves and ocean waves.
- For these types of waves, it is only the energy message (compression wave) that moves with the wave, not the media that form the wave.
- If we can call an ocean wave a wave, and if we cal call sound a wave, then it would seem acceptable to refer to a photon as a wave (but not a particle wave).

Can a photon be a particle and a wave?



Ocean waves outside the breaker zone

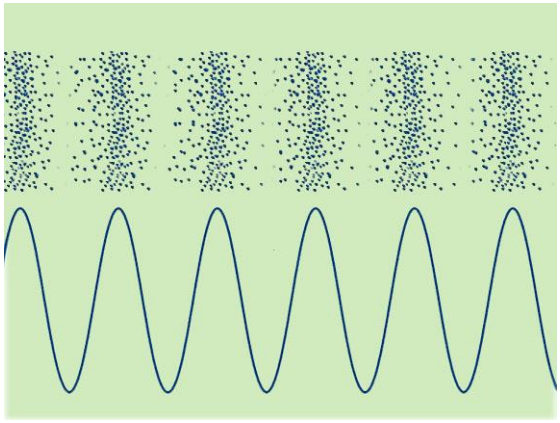
Deep water ocean waves

- Deep water waves are virtual waves.
- An ocean wave, at any instant, is formed from water particles, but those particles don't travel with the wave.
- This means that if you were floating in the ocean, and you were 'hit' by an ocean wave (i.e. a deep water wave), then you would feel only a very minor lateral force, even though the wave may have a mass of several tonnes.

Being 'hit' by a wave

Coastal waves

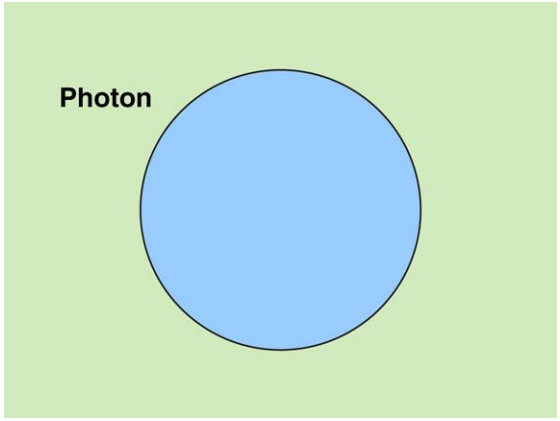
- A breaking coastal wave is in fact a particle wave.
- This means the water that forms the wave is now moving with the wave.
- This means that a coastal wave can transfer momentum.
- This means that if you are standing in the surf zone, and you are 'hit' by a wave, you will feel the crashing force of the wave, and this force will try to push you towards the beach.



Sound waves

Sound waves

- Sound waves are virtual waves.
- This means that the media that forms the wave, does not move with the wave.
- This means that when a sound wave hits you, you may feel the effects of the media vibrating (e.g. the air), but not the effects of the air moving at the speed of sound.
- This means, that even though sound travels at about 335 m/s, it is not the same as wind hitting you at 335 m/s.



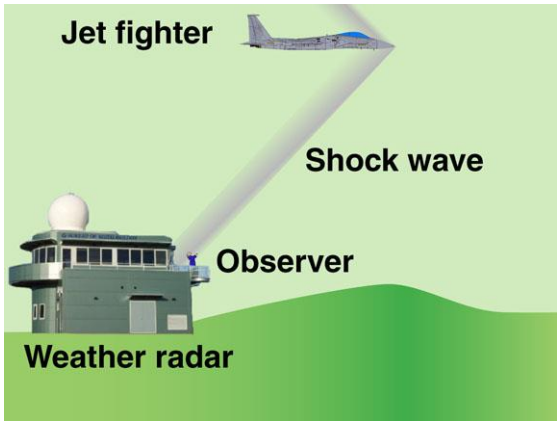
Photon

Photons

- So, the question remains: Does a photon travel as a real wave or a virtual wave?
- Is it:
  - a virtual particle that creates a wave
  - a virtual particle that takes the form of a transverse wave (like an ocean wave)
  - a virtual particle that takes the form of a longitudinal wave or pulse (like a sound wave), or
  - a wave that contains a massless particle at its core?

The story of two types of waves

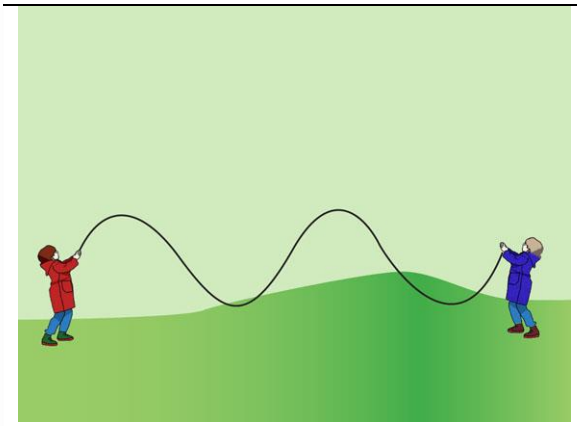
FA-18C in transonic flight



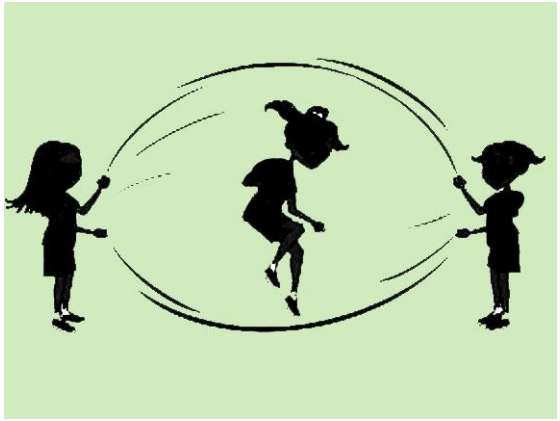
Shock wave

Story of a fighter jet

- Imagine a world where human flight did not exist; where aircraft were just something we imagine may exist one day.
- Now imagine you have a job at the local weather station, which has an advanced weather radar system.
- Suddenly there is a tear in the fabric of time, and a modern supersonic fighter jet passed through this tear, and enters your world.
- You detect the fighter jet on your weather radar, and it is clear that this UFO is a single object, and it is travelling very fast—faster than any known weather front.
- The fighter jet flies past your weather station at a speed exceeding the speed of sound.
- You hear the sonic boom, and you see the windows shake all around your weather station.
- So, the radar detected a ‘particle’, but the observer (you) detected only a ‘pressure wave’.



Rope wave



Skipping

Story of a skipping rope

- You and a group of friends are skipping for a bit of fun and exercise.
- Someone stands next to the rope ready to start skipping; however, the person at the far end of the rope is not paying attention.
- You shake the rope to get your friend’s attention (i.e. you send an energy message in the form of a wave).
- You create the wave by quickly moving your hand up and down.
- You know your friend received your energy message because you see the rope move her hand.
- So, is it correct for you to say that the wave that you created, actually travelled the length of the rope?
- Did the ‘wave’ travel at all?
- Well, the profile of the wave travelled, but the rope did not travel.
- It is really only the energy that moves, which is what actually gets your friend’s attention.

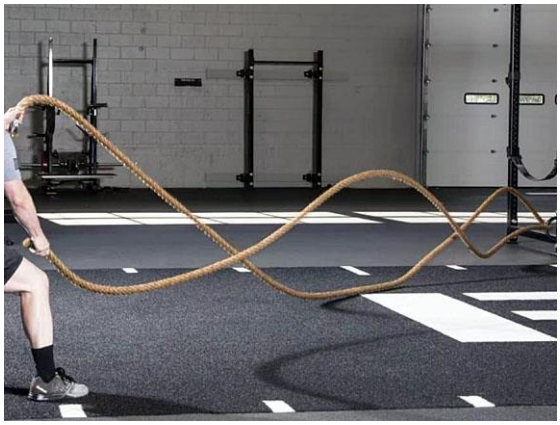
Moving particles always generate waves

Arrrrrrrrrrrrrrrrrrrrrrrr!

What we can learn from the fighter jet story

- What we can learn from the first story is:
  - a ‘particle’ in motion can produce a moving wave, but that does not make the particle a wave.
- Even an engineer (like myself) would act like a particle, that would produce a screaming sound wave, if pushed off a building.

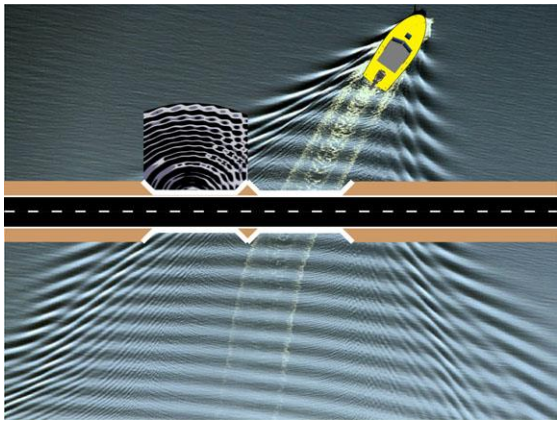
(Yes, there is a long queue people wanting to give me a little push, and I fear the queue is only getting longer).



Rope wave

What we can learn from the skipping rope

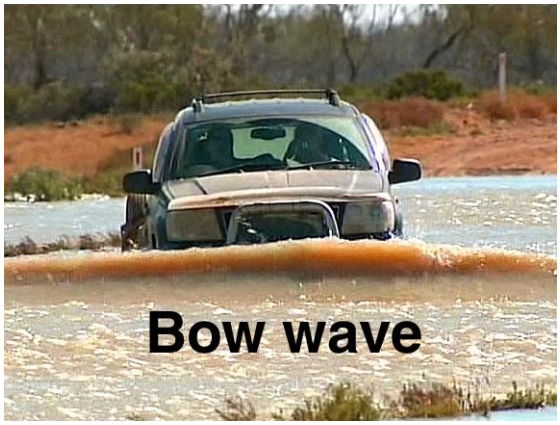
- What we can learn from the second story is:
  - if you generate a wave at one end of a communication line (such as a rope)
  - and you detect a similar wave at the other end of the communication line
  - that does not mean that anything, other than energy, has travelled along that communication line.



Boat wake passing under a bridge

Particles that generate waves

- I am not sure why it is difficult for people to accept that a ‘photon’ can display the properties of both a particle and a wave, after all, many of the day to day items that we interact with have both particle and wave properties:
  - a plane with a sound wave
  - a car with an engine noise
  - a boat with a wake.
- If you drove a speed boat through a double arch bridge, then you would have a double slit experiment!

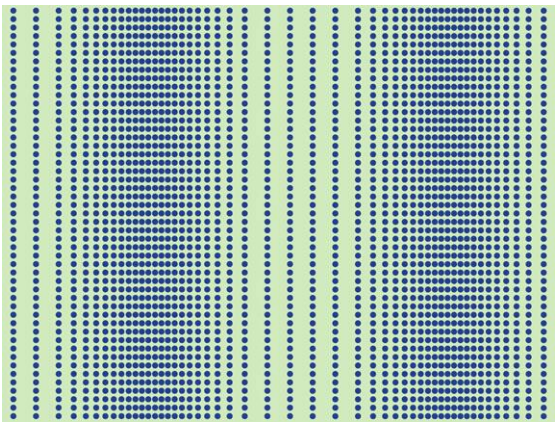


Vehicle crossing at subcritical velocity

Cars crossing a flooded causeway

- Cars driving through floodwater can produce a bow wave.
- The profile of the wave, and the horizontal curvature of the wave, depends on the speed of the car, and the depth of the water.
- The car travels as a particle, and that particle generates a wave, which means that collectively it will display the properties of a particle and a wave, but a car is not a wave.

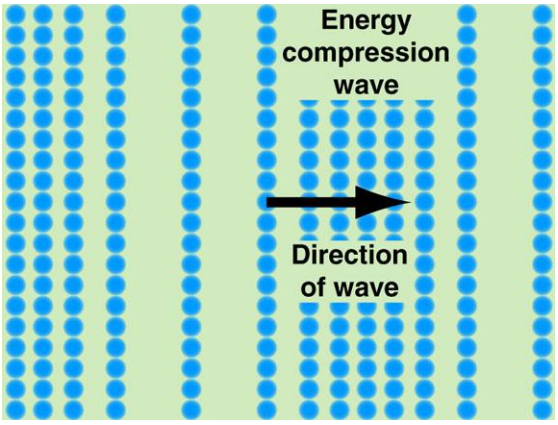
Energy waves, compression waves and virtual waves



Energy waves moving left to right

Energy waves

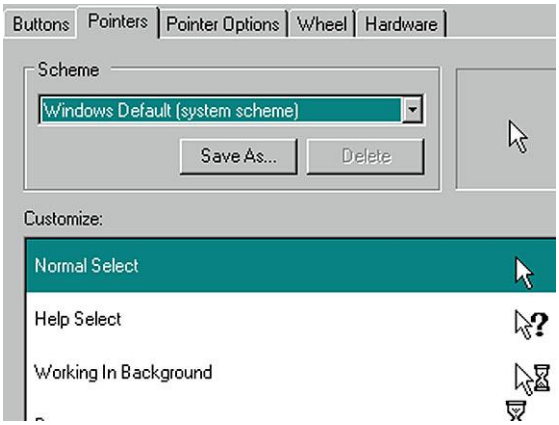
- An energy wave is a flow of energy through a series of objects.
- In effect, an energy wave is a flow of forces from object to object.
- This is because all of the actions that occur within our universe, occur because of the application of forces—even human thought.
- When dominos fall, it is a force that transfers the energy onto the next domino.



Compression waves

Compression waves

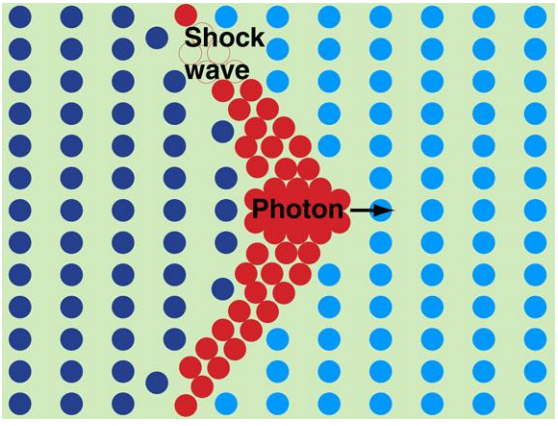
- A compression wave is an energy wave that progresses due to a compression of the media.
- This compression is generated by a force.
- This compression is then followed by an expansion, which is all part of the wave.
- This expansion, like the compression, is caused by the transfer of forces from object to object.



Computer screen pointer

Virtual waves

- A true virtual wave is the situation where a wave appears to exist, but only in a person's mind.
- In reality there is no movement of energy or media.
- The movement of a computer screen pointer is an example of virtual movement.
- All movies and videos use virtual movement, including virtual waves.
- A fixed panel of lights can be used to create a virtual wave of flashing lights.



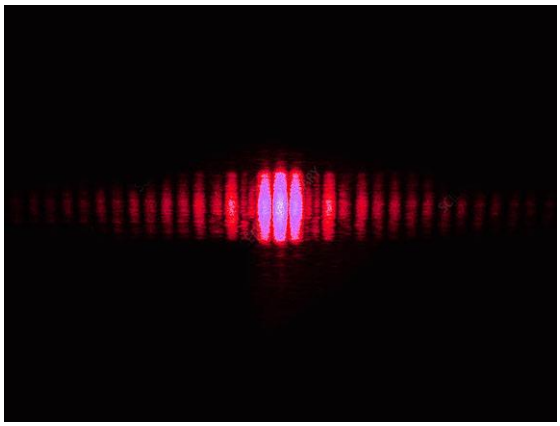
Photon and attached shock wave

Photon waves

- A photon consists of:
  - a central concentration of quantum forces, which forms a virtual particle, and which moves as a pulse
  - which is surrounded by a shock wave of compressed quantum forces, generated by the fact that the central pulse is moving through a field of quantum forces at the critical velocity of the quantum forces
  - it is within this shock wave that the full colour spectrum exists.

6. The Properties of Light

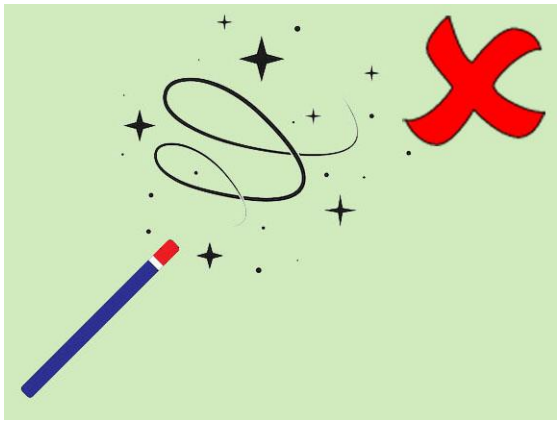
Introduction



Double slit experiment

The importance of this information

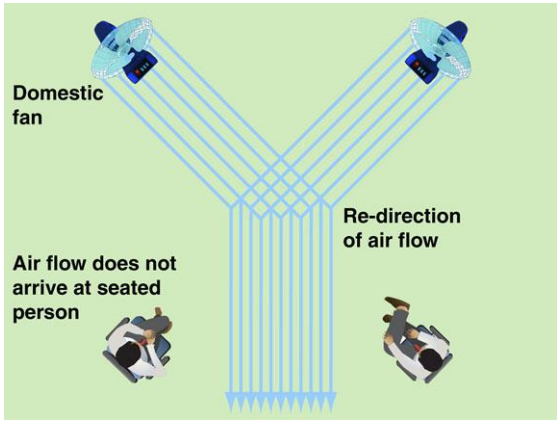
- We need to correctly understand the properties of light in order to correctly understand the outcomes of the double slit experiment.
- The double slit experiment is important because it reveals many of the key properties of light.
- You just have to follow the physics, and remind yourself that there is no 'magic' in real life, in order to understand the properties of light.



Nothing magical

Resorting to a belief in magic

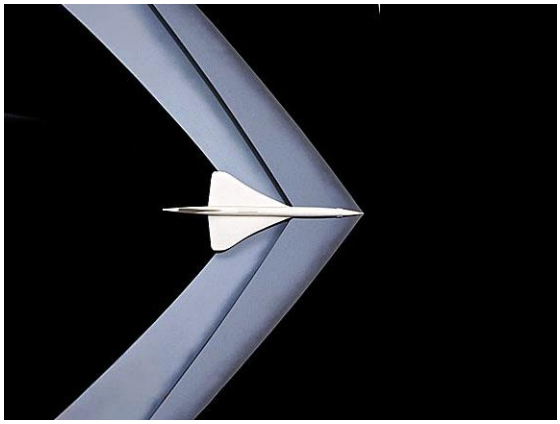
- At the start of this publication I stated that our knowledge of physics should prevent us from believing in magic.
- Statements like: *'light only decided what it is going to do once it is being observed'* do not help the advancement of physics.
- It is not a bad thing to admit we do not understand our observations.
- It is better to say we don't understand, then to pretend that light has magical properties.



A flow of air cannot experience CDI

The contribution of wave theory

- Wave theory can provide us with a major contribution to our understanding of the double slit experiment.
- Lesson 1: Only energy waves can experience constructive and destructive wave interference (CDI).
- Lesson 2: If a wave facilitates the transportation of particles (physical matter) then the wave cannot experience such interference patterns.



Sound-based shock wave

The contribution of fluid mechanics

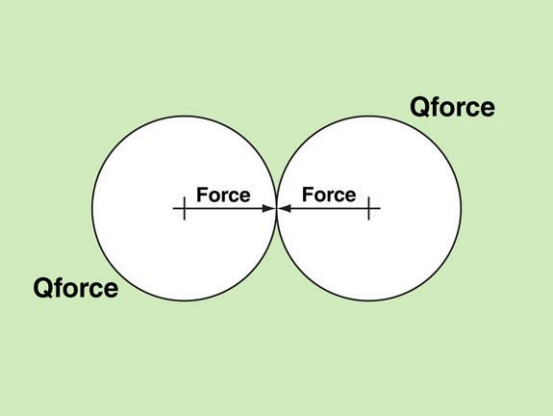
- Fluid mechanics provides us with another key contribution to our understanding of the double slit experiment.
- Lesson 3: A physical object moving through a media typically produces a wave within that media.
- Lesson 4: If an object moves at the speed of causality, then a shock wave is produced.
- Lesson 5: It does not matter if the object is a physical particle, or a virtual particle, a shock wave is still produced.

Light

- Light is not magical.
- Light is not more strange than you think.
- Light is not difficult to understand.
- Light is no more complex to understand than sound.
- Light does not have unique properties.
- Light obeys Newton physics.
- Light is not a transverse wave.
- Lights is not electromagnetic radiation, even though it produces electromagnetic radiation. Similarly, a petrol car is not exhaust gas, even though it produces exhaust gas.
- Light cannot travel through a true vacuum.
- Light does have a constant velocity in a vacuum; it would be zero m/s!
- The speed of light is not a universal constant.
- Light is not a physical object that contains no mass.
- Light is massless only to the same extent that sound waves and deep water ocean waves are massless.
- Light can apply a force because light is a force.
- Light is not watching you to see if you are watching it.
- Light does not have a brain, so light cannot see you, watching it, seeing you, watching it!
- Light does not get embarrassed, and does not put on cloths if it feels it is being watched.
- Light does not decide what to wear to the ball only after it has arrived and checked out if anybody important has arrived.
- Light has no intelligence. In fact, if you can see light, or feel light on your face, then you have more intelligence than the light with which you choose to interact. (grammar?)
- Even I am more intelligent than light (on my good days).

Please people. It is time to wake-up. If you look around and all you can see is darkness and things that are difficult to understand, then it is time to climb out of the rabbit hole that your school and university education has led you. Climb towards the ‘light', and free your brain.

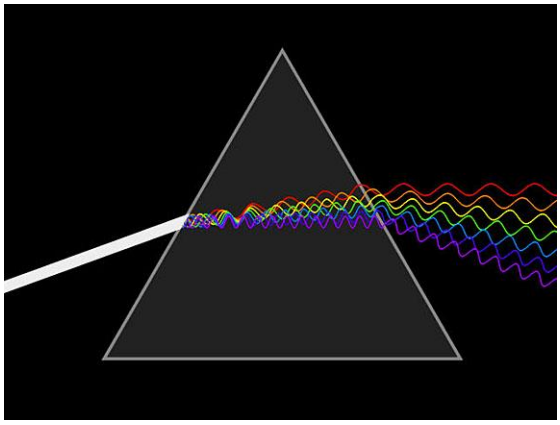
Light and quantum forces



Two quantum force units

Introduction

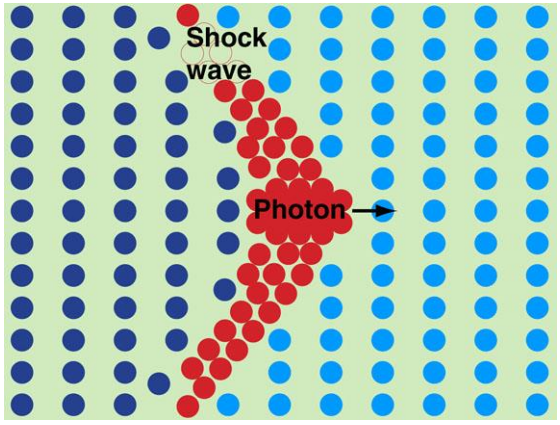
- This paper makes the following assumptions:
  - everything in the universe is formed from quantum forces (or similar)
  - every action that occurs within the universe occurs as a result of a force
  - a quantum force has one action, that being to repel all other quantum forces
  - free quantum forces (aether) push against a concentration of quantum forces (matter), which stabilises this concentration of forces.



Light

Light

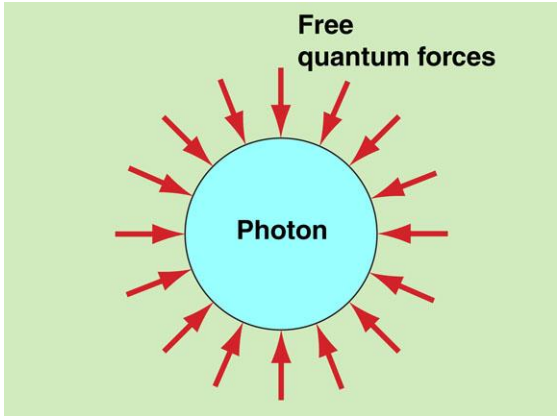
- Light, like everything else in the universe, is formed from the concentration of quantum forces.
- However, light only exists as a virtual particle, meaning that the concentration of quantum forces exists only in a temporary state, generated by the passing of an energy wave (i.e. a compression wave).
- Light passing through aether is equivalent to sound travelling through air (well, almost!).



Possible arrangement of a photon

Photons

- In reality, a photon is anything we define it to be (within any given language).
- However, in this paper I shall define a photon as just the central concentration of quantum forces.
- Thus, my definition of a photon does not include the attached shock wave.
- The photon uses part of its energy to form the attached, three-dimensional shock wave.

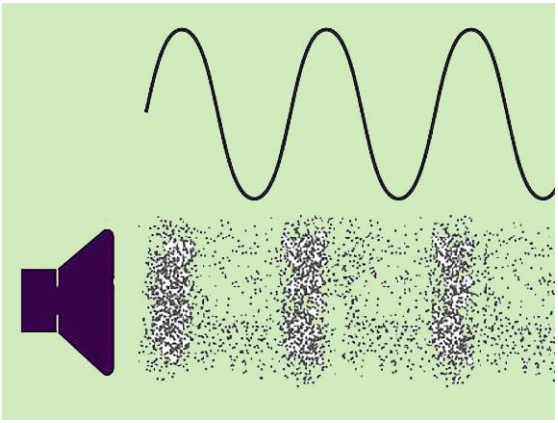


Stabilised photon

The stability of a photon

- Like any concentration of quantum forces, at any instant, the forces remains stable because of the surrounding non-concentrated quantum forces (aether).
- If the photon loses too much energy, then there can be insufficient quantum forces to maintain the stabilising effects of the surrounding aether, which will cause the photon to become unstable, and collapse.
- This means that all photons eventually turn back into aether.

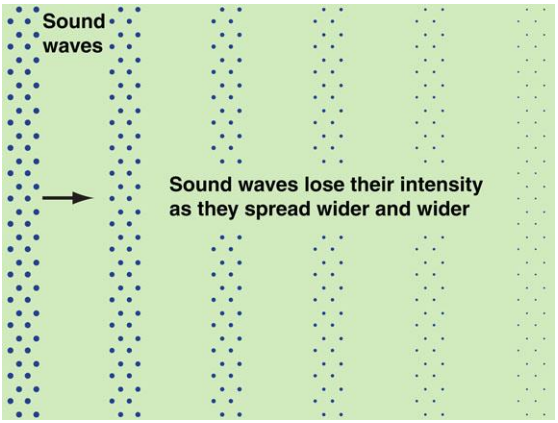
Why are photons stable, while sound waves are not?



Sound waves

Sound waves

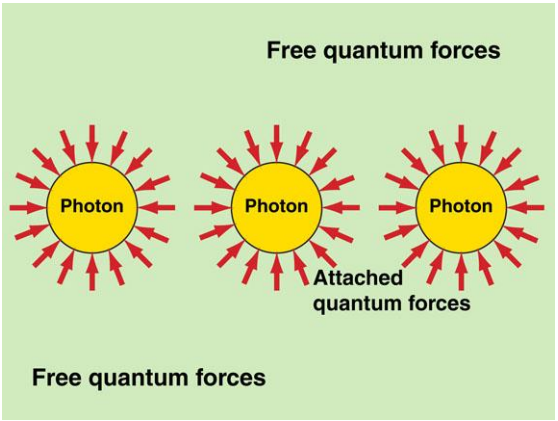
- If we accept that light shares many characteristics with sound waves.
- And if we accept that a photon is not a physical particle.
- Then why do sound waves have a relatively short lifespan, while photons have a very long lifespan, which allows them to exist for many years?



Reducing intensity of sound waves

The stability of sound waves

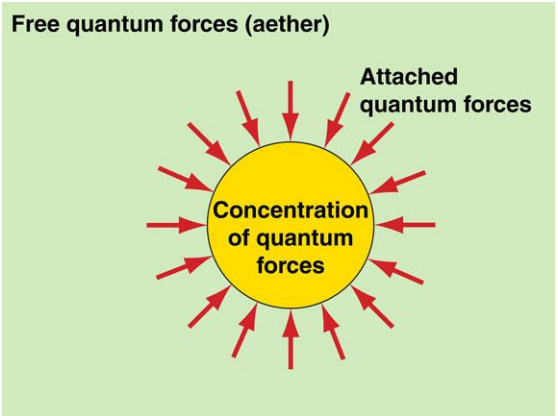
- Sound waves lose their intensity as they expand over wider and wider areas.
- The wide expansion, or spread, of sound waves is due to wave diffraction.
- Given that a sound wave is a transient compression or vibration of the media through which it travels, eventually:
  - the compression will fully dissipate, or
  - the vibration will stop due to friction.



External forces acting on a photon

The stability of photons

- A photon is also a transient compression of the media through which it travels, however:
  - the compression of quantum forces occurs because of the inward force of the surrounding quantum forces
  - a photon is limited in its expansion due to these same quantum forces
  - if the opportunity exists, the shock waves of several photons will join together, which links the photons.

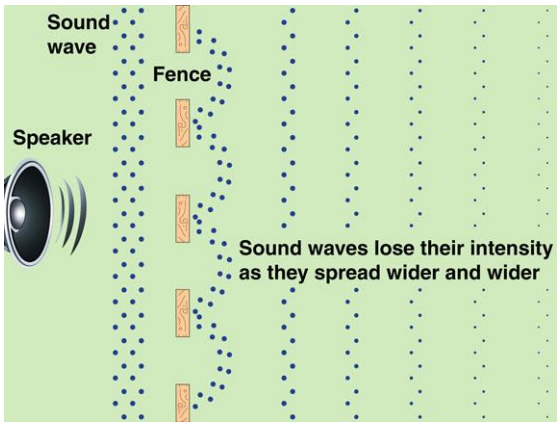


External forces acting on a matter

The stability of physical matter

- We could equally ask, why does a planet stay together, and not simply disperse into cosmic dust?
- Of course our answer would be 'gravity'.
- But, as will be shown in the final chapter, this thing called gravity, is just the effect of the quantum forces that surround the planet, all pushing inwards on the planet.
- Yes, gravity is a force.
- And, gravity is a pushing force, not a pulling force.

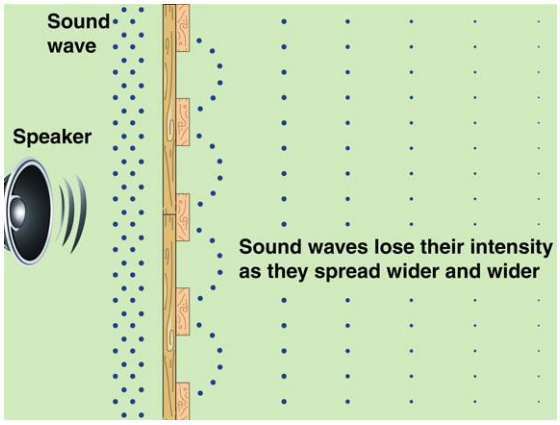
The collapse of sound waves



Sound passing through a picket fence

Introduction

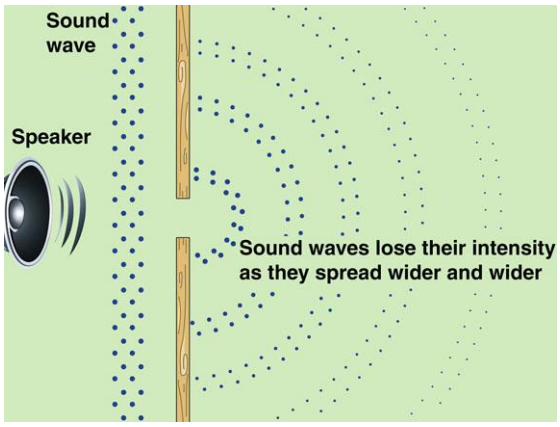
- When sound travels through several narrow gaps, such as a picket fence, the divided sound waves will likely rejoin beyond the fence and continue to expand (diffract).
- This continued expansion will decrease the intensity of the sound.



Sound passing through a lattice screen

Passing through a lattice fence

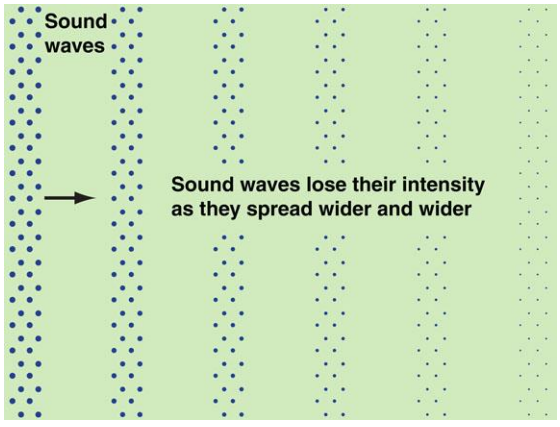
- When sound travels through the gaps in a lattice fence, there is an even greater loss of energy compared to a picket fence.
- However, once again the depleted sound waves will likely rejoin beyond the fence, and continue to expand (diffract).



Sound passing through a single gap

Passing through a single gap

- When sound travels through a single gap, the loss of energy is even greater.
- After passing through the gap, the sound waves will continue to diffract and lose their intensity.



Sound travelling over a distance

Sound travelling over a distance

- Ultimately sound waves lose their intensity because the compressed media (air) continues to expand back to the background concentration.
- Quantum forces will surround all air particles, just like they do around any form of matter, and these forces will try to maintain the compression of the air that forms the sound wave, but the Brownian forces that separate gas particles are stronger that the quantum forces that try to keep them together.

Brownian motion

Earth and Moon

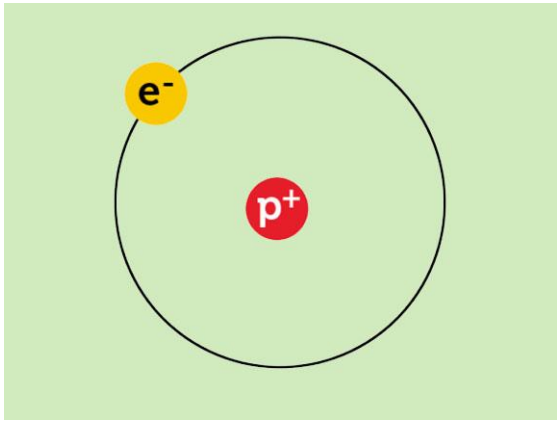
Introduction

- *'Brownian motion is the random motion of particles suspended in a medium'* (Wikipedia, 2024).
- An explanation of Brownian motion can be found in astrophysics.
- We know that the orbit of the Moon around Earth causes the Earth to orbit the centre of mass of the combined Earth and Moon.
- Therefore, the Moon's orbit causes the Earth to 'vibrate' very slowly.

Wheel balance test

An out-of-balance wheel

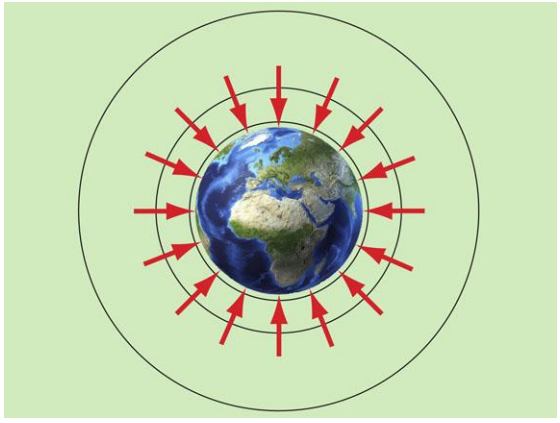
- We all know the effects of having an unbalanced wheel on a car—the wheel begins to vibrate.
- A similar action occurs if a ceiling fan is out of balance.
- If it were possible to place unbalance motors (i.e. vibrating motors) on several round sleds, and then release these onto a ice skating rink, a series of collisions would occur, in a manner similar to Brownian motion.



Atom

The vibration of atoms

- Just like the Moon's orbit causes a vibration in the Earth, the orbit of an electron around a nucleus can cause the whole atom to vibrate if the net movement of the electrons around the nucleus is out of balance.
- This vibration is very fast, and very powerful relative to the mass of the atom.
- The near-miss and exchange of electrons also contributes to Brownian motion.

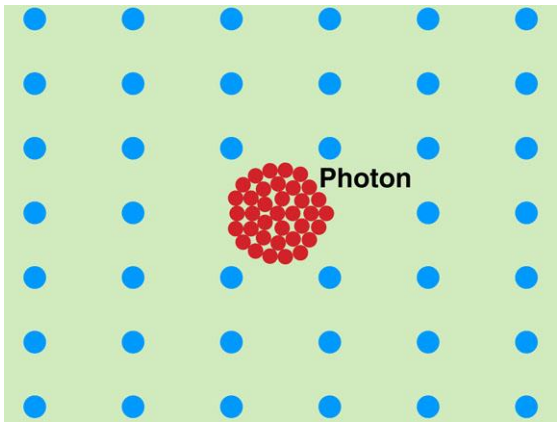


Earth's gravity

The power of Brownian motion

- The forces generated by Brownian motion far exceed the binding forces of quantum forces.
- This is why the gases of our atmosphere are able to expand as a 'shell' around the Earth, even though the quantum forces that fill space are pushing inward on these gases (i.e. as the force of gravity).

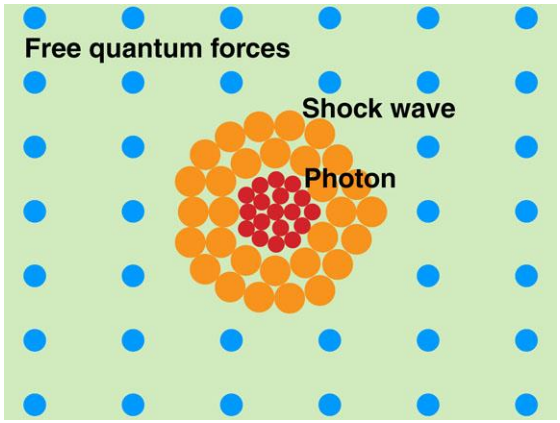
The collapse of a photon



Initial photon pulse (front view)

Initial photon

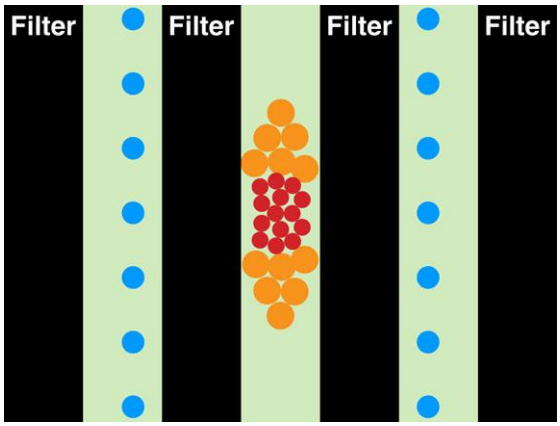
- A photon is a concentration of quantum forces, which is held in compression by the free and attached quantum forces that surround the photon.



Photon and shock wave (front view)

Building of the shock wave

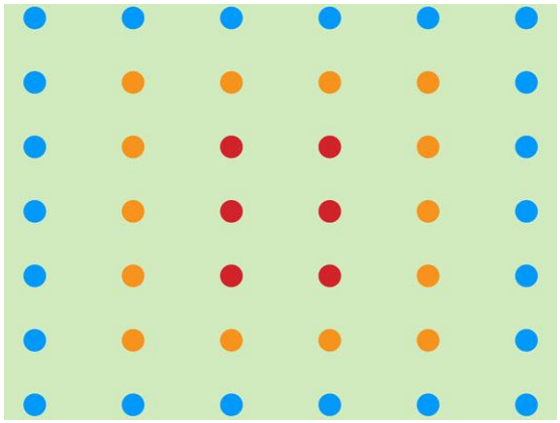
- The movement of a photon at the speed of causality creates a shock wave, which is attached to the photon.
- The shock wave is formed from the same compressed quantum forces as the central photon.
- Even though a photon has a diameter of a fraction of a millimetre, the shock wave can have a diameter that grows to a size of several centimetres (as evident by the double slit experiment).



Filtered light (front view)

Passing light through a filter

- When a photon and its shock wave pass through a polaroid filter, most of the shock wave is removed from the photon.
- The photon itself will either:
  - pass through one of the gaps
  - impart a force onto atomic particles within the filter, after which the photon will convert back into free quantum forces, or
  - reflect off the filter.

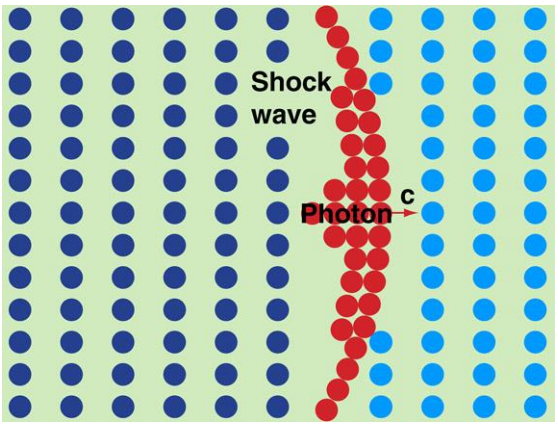


Collapse of a photon (front view)

Collapse of the photon

- After passing through a narrow gap, the photon will try to rebuild its shock wave because it continues to move at the critical velocity of the media.
- If the rebuilding of the shock wave takes too much energy from the photon, then the photon will no longer have sufficient energy to maintain its stability.
- Just like the collapse of a half photon, these depleted photons will collapse and return back into free quantum forces (i.e. aether).

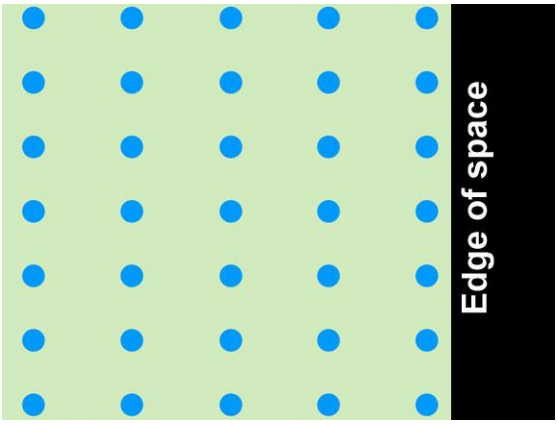
Light moves as an energy wave, not as a particle wave



Photon pulse

Introduction

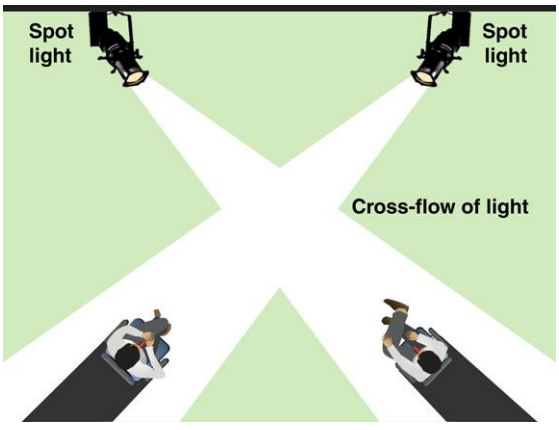
- Light travels as an energy wave.
- Light does not transport physical particles.
- The energy wave moves as a compression wave (pulse) of concentrated quantum forces.
- The central component of a photon is a virtual particle, which means the quantum forces (i.e. the media) do not move with the photon.



The edge of space

Expansion of the universe

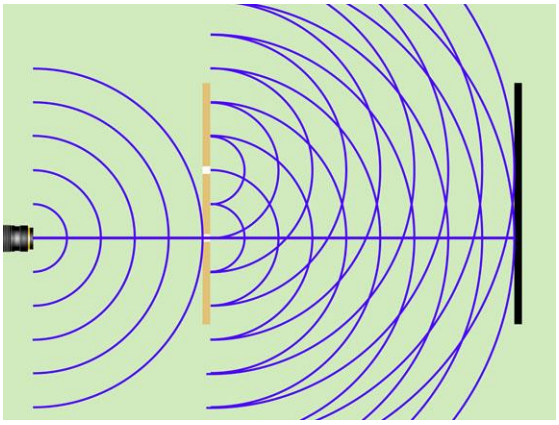
- Conformation of the energy wave theory can be seen in the rate of expansion of the universe.
- If light did exist as a particle wave, then such particles could readily move beyond the current edge of space.
- This would mean that the universe would be expanding at the speed of light.
- However, as an energy wave, light must collapse at the edge of space, and the expansion of space would be linked only to the local quantum force pressure.



Cross flow of light beams

Energy and momentum transfer

- Conformation of the energy wave theory can also be seen in the fact that light can impart energy and momentum onto physical matter, but not onto other examples of light.
- Rather than transferring energy and momentum between photons, light allows photon energy to pass through, and move beyond, other examples of photon energy without a change in energy or direction.
- This action is similar to the properties of ocean waves and sound waves.

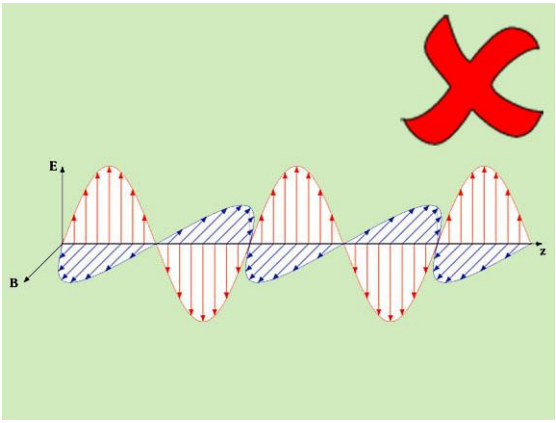


Constructive and destructive interference

Constructive and destructive interference

- Conformation of the energy wave approach can be seen in the occurrence of constructive and destructive interference within the double slit experiment.
- Particle waves cannot experience constructive or destructive interference.
- Only energy waves can experience constructive or destructive interference.
- Not all waves share the properties of all the other wave forms.

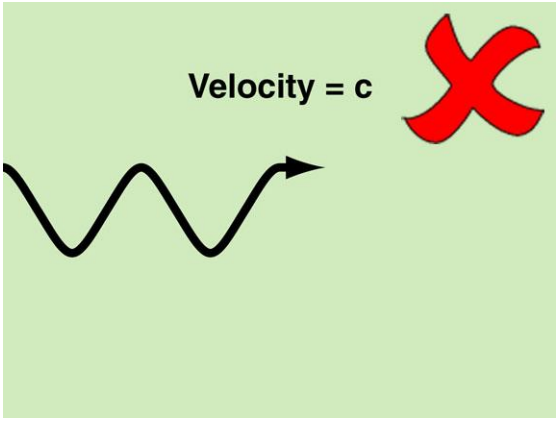
Light moves as a longitudinal wave, not as a transverse wave



Light is not electromagnetic radiation

Light is, or is not, a form of electro-magnetic radiation

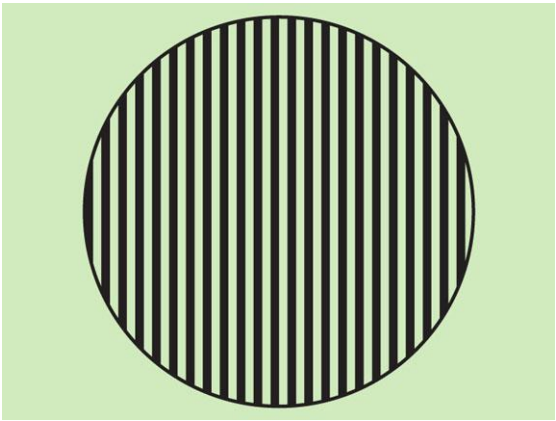
- A petrol-engine motor car produces exhaust gases, but that does not mean that a car is a form of exhaust gas.
- The movement of light produces electrical and magnetic effects, but that does not make light electromagnetic radiation.
- However, speakers of any language are masters of that language, so if we choose to call 'light' a form of electromagnetic radiation, then we are free to do so.



Light is not a transverse wave

Light travels as a longitudinal wave

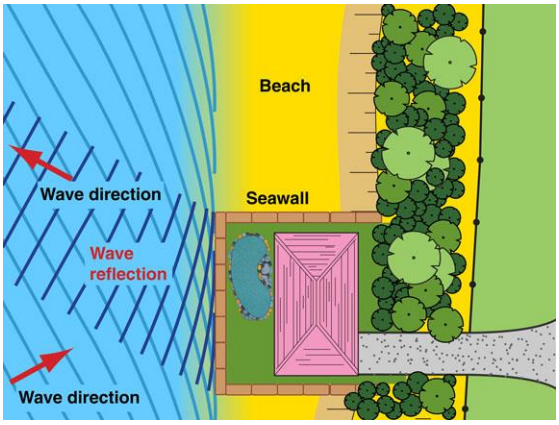
- Light exists as a compression wave (pulse) of compressed quantum forces.
- This compression wave moves through the media of free quantum forces in the same way that sound waves move through the air.
- A compression wave is a longitudinal wave, not a transverse wave.
- The fact that light may, or may not, generate a transverse wave as a by-product of its movement does not make light a transverse wave.



Polaroid (vertical-slot) filter

The polarisation of light

- The filtering of light through a polaroid filter does not prove that light moves as a transverse wave.
- Light exists as a centroid of concentrated quantum forces, surrounded by a three-dimensional shock wave of less-concentrated quantum forces.
- A photon will lose part of its shock wave when it moves through a filter, which turns a 3D photon into a near-2D photon.

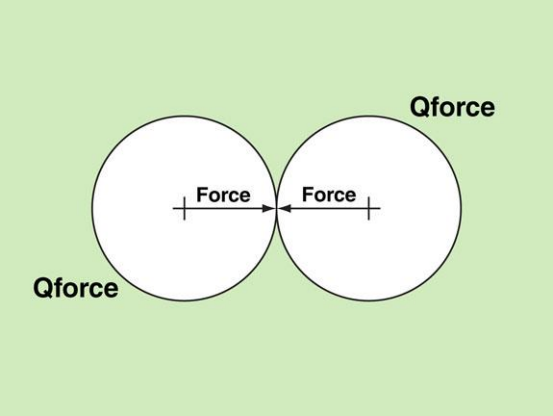


Reflected coastal waves

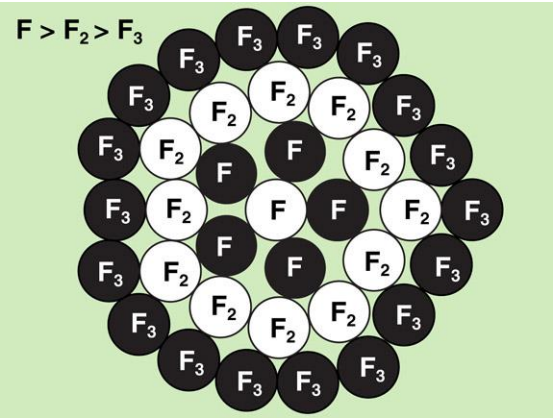
Reflected waves

- Reflected light waves are known to experience a polarisation effect which appears to align the waves to the plane of the reflecting surface.
- This outcome causes the shock wave to reflect back on itself, which can cause a cancelling of parts of the shock wave.
- This effect depends on the shape of the shock wave, and the roughness of the reflecting surface.

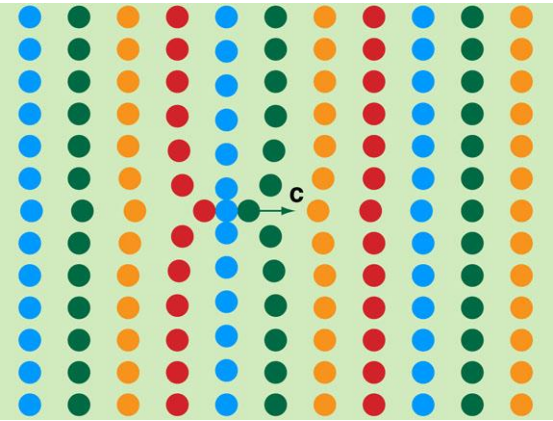
The movement of light generates electricity



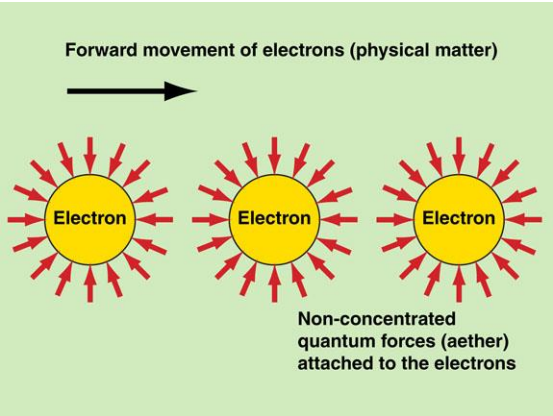
Repelling force



Concentration of quantum forces



Movement of a virtual particle



Flow of electrons and quantum forces

Quantum forces

- In order to understand the relationship between light, electricity and magnetism, we need to return to the properties of a quantum force.
- A quantum force has only one task, that is to repel other quantum forces.
- Through this one action it can be demonstrated that a region of concentrated quantum forces will be surrounded by free quantum forces, which act to further concentrate that region.

(For obvious reasons I have avoided use of the term: 'quantum force field')

- Through this simple action of physics, quantum forces are able to form stable concentrations of quantum forces, ultimately forming matter, planets, and the rest of the universe.
- Consequently, the stability of a concentration of quantum forces (matter) depends on the existence of the surrounding field of quantum forces (aether).
- If matter moves, it will also move some of the surrounding aether, and if the aether moves, it will move the attached matter.

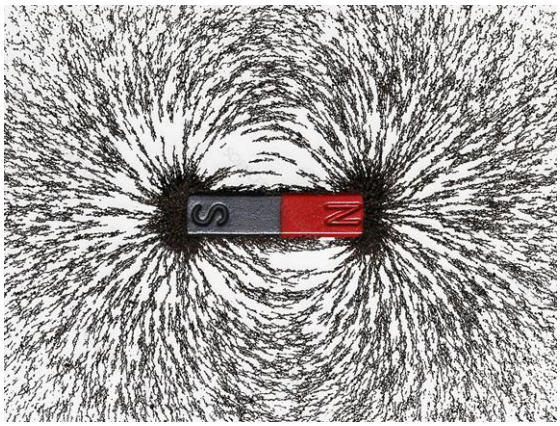
If matter is formed from a concentration of quantum forces, then why is 'light' not considered a form of matter?

- All matter is a product of concentrated quantum forces, and light also exists as a concentration of quantum forces.
- When matter moves, the same collection of quantum forces (Qforces) moves with the matter (more correctly; as the matter).
- However, when light moves, the forces that concentrate the quantum forces shift from Qforce to Qforce, without moving individual quantum forces.

The movement of an electron

- When electrons move along an electrical wire, each of these electrons will be transporting with it, its own attached quantum forces.
- The movement of the electrons (i.e. matter) is electricity, and the associated movement of attached quantum forces is magnetism.
- Because the movement of light causes the movement of concentrated quantum forces, it creates electricity, but much less than moving electrons.

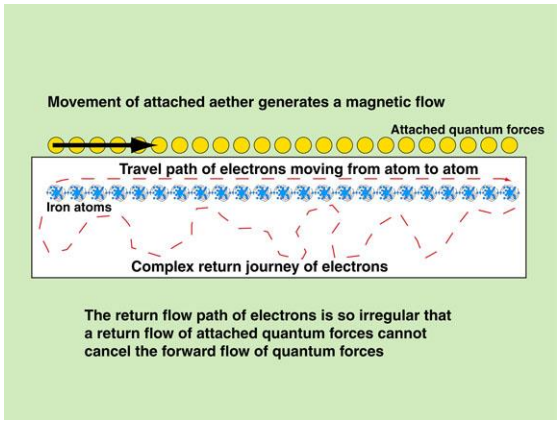
The movement of light generates magnetism



Magnetic field

Magnetic fields

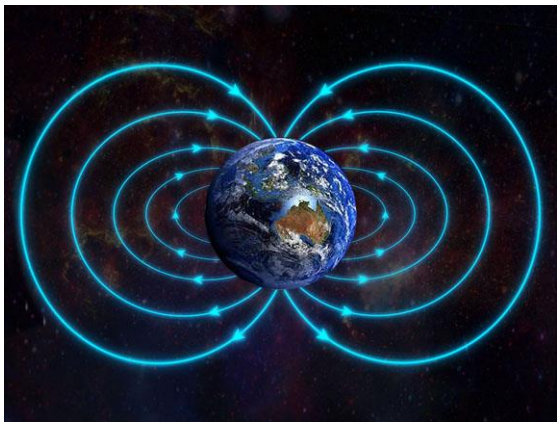
- Magnetising a metal bar causes the molecules to align in such a manner that electrons can freely flow in one particular direction.
- However, this process does not allow the electrons to follow a similar ‘straight’ path in the opposite direction.
- This dominant flow of electrons in a ‘straight’ path causes attached quantum forces to also move in the same direction, thus forming magnetism.



Electron flow in an iron magnet

The mechanics of magnetising an iron bar

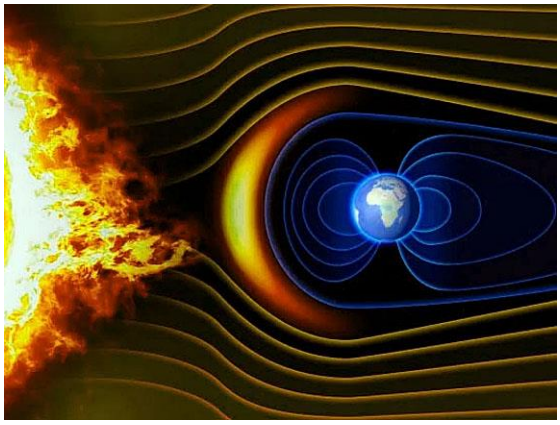
- Only certain materials can be magnetised, meaning that these materials can hold a magnetic charge while stationary.
- The material requires an atomic structure that, when aligned, allows electrons to move rapidly in one direction, but not in the opposite direction.
- This electron movement causes a similar flow of the attached aether.
- However, the return pathway of electrons remains random, which prevents the formation of an opposing aether flow.



Earth’s magnetic field

Earth’s magnetic field

- Because the Earth is formed from concentrated quantum forces, and because the Earth is held in space as a stable concentration of these forces, the Earth has an attached cloud of non-concentrated quantum forces.
- These attached quantum forces are just Earth’s captured bit of aether (space).
- This captured aether moves with the dominant flow of electrons held within the Earth’s iron core.

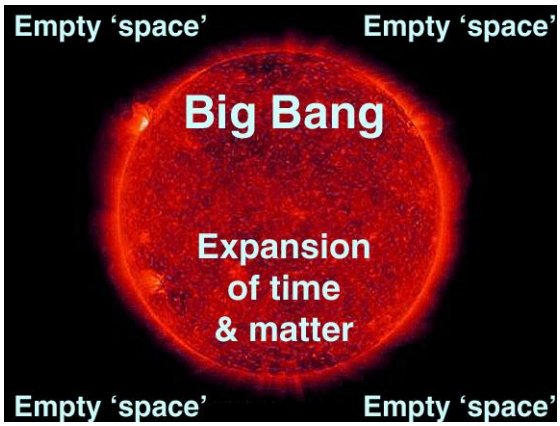


Protection from solar winds

Earth’s protector

- Because the Earth’s magnetic field is formed from the same non-concentrated quantum forces (aether) as the rest of space, the magnetic field is able to repel free aether, or aether winds (solar winds).
- It never seemed logical to me that Apollo capsules could bounce off Earth’s atmosphere, but what does seem logical is Apollo capsules bouncing off Earth’s magnetic field if they approached Earth at the wrong angle.

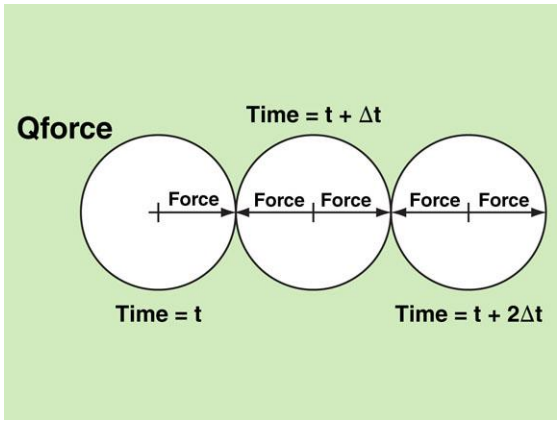
Light and Time



The Big Bang

The Big Bang

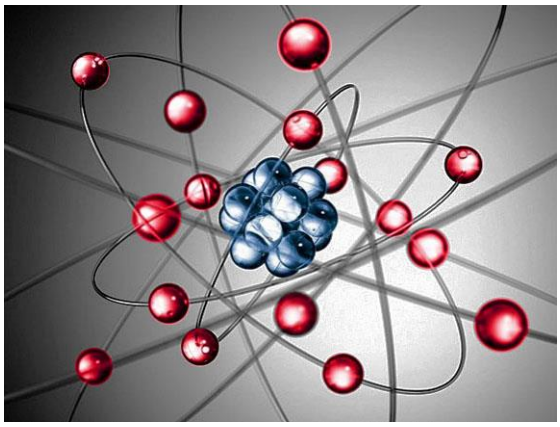
- It is assumed that nothing existed prior to the Big Bang.
- It is assumed that a quantum force has no physical existence, and therefore is equivalent to 'nothing'.
- It is assumed that after the Big Bang there was only an expanding cloud of quantum forces.
- This concentration of quantum forces was unstable because it was surrounded by empty space (i.e. no quantum forces).



Responding to a change in force

The speed of causality

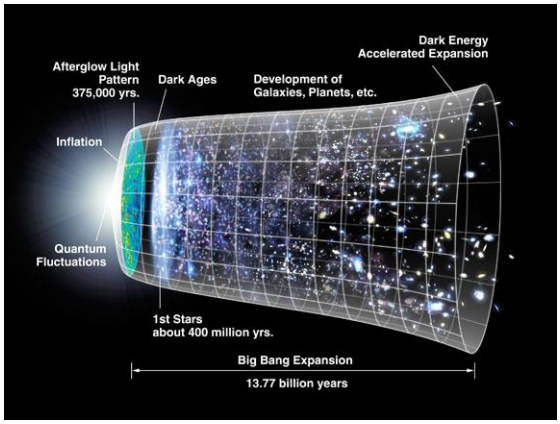
- All actions performed by the quantum forces are governed by the response rate of each individual quantum force (i.e. the speed of causality).
- This suggests that Time must be an integral property of each individual quantum force, or simply a by-product of movement.



Atom

If Time was an internal property of quantum forces

- If Time was an internal property of quantum forces, and if time did alter in response to velocity, then:
  - the rate of time experienced by an electron would be different from that of the nucleus
  - the rate of time experienced by an electron would be different for each orbital radius of each electron shell.

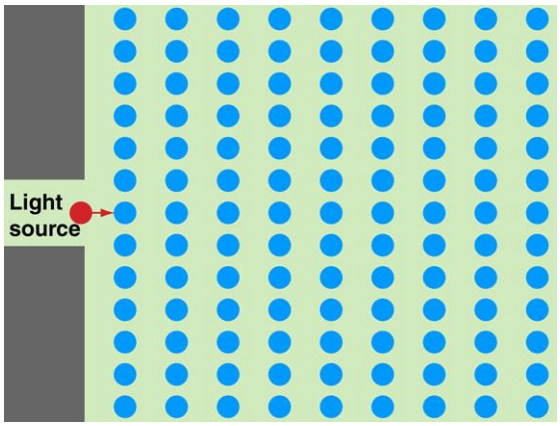


Accelerated expansion of space

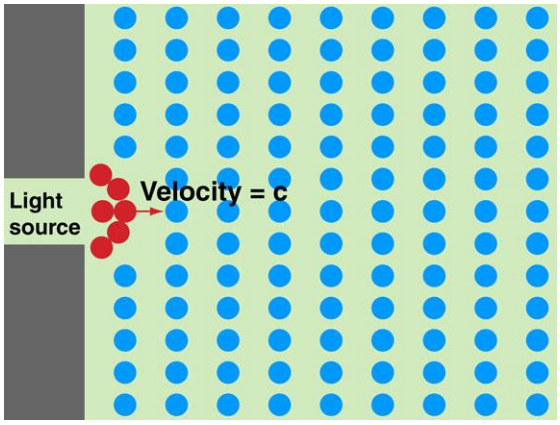
If Time was an internal property of quantum forces

- If Time was an internal property of quantum forces, and if the rate of time did alter in response to velocity, then:
  - to an observer located on Earth, planets and galaxies would appear to be moving faster if the rate of time slowed at the location of the observer.
- But, all of that involves a lot of 'IFs'.

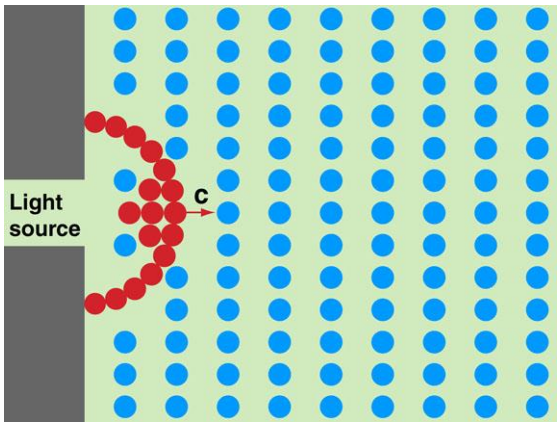
The initial acceleration of light up to its maximum speed



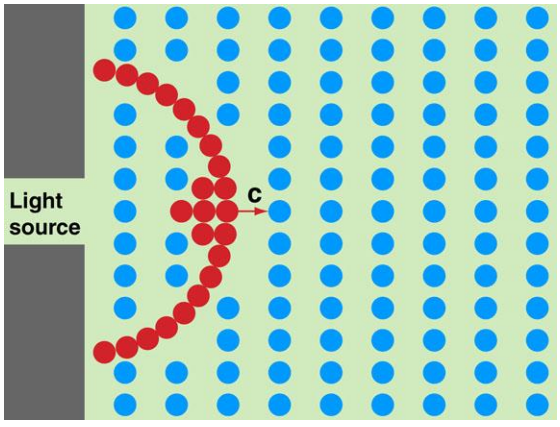
Initial release of a single photon



Growth of an energy shock wave



Growth of an energy shock wave



Growth of an energy shock wave

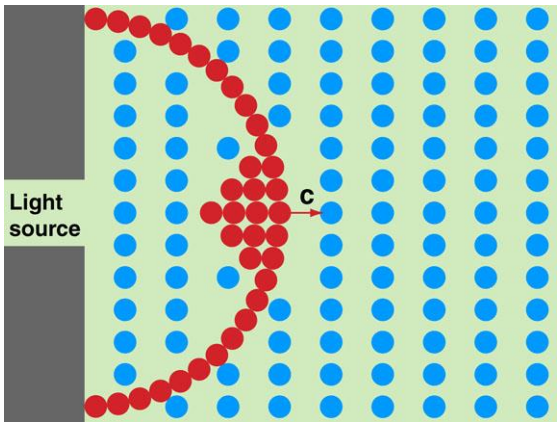
The 'physics' of movement at the speed of causality

- When a physical object, or a force message, travels at the speed of causality, then:
  - no 'warning' of its movement can move forward of the object, which causes a shock wave to occur
  - behind the object, other objects would know that this object had passed
  - if the object is physical matter, then it will act like a snow plough collecting more matter (i.e. unsustainable).

The initial movement and acceleration of light

- At the start, some type of trigger begins to form a concentration of quantum forces (aether).
- However, because the free quantum forces that surround this concentration of quantum forces are not uniform in their distribution, the growing photon is not held as a stable physical particle, but allowed to exist as a moving virtual particle.
- The virtual particle causes a transfer of forces, which occurs at the speed of causality (i.e. the speed of light).
- The free quantum forces in front of the photon have no idea that this virtual particle of compressed quantum forces is moving forward.
- This means the quantum forces in front of the photon still think that the quantum forces behind them are not concentrated, so they exert only a minor force towards the approaching photon.
- Meanwhile, the quantum forces behind the photon know these quantum forces are concentrated, so the force they exert on the rear of the photon is greater that the force being applied to the front of the photon.
- The rapid approach of the virtual particle creates a shock wave in the field of quantum forces, which behave like a fluid.
- Given the questionable mass of the virtual particle (the photon), this net force will generate an almost instantaneous acceleration.
- The shock wave attached to the photon is formed from the compression of free quantum forces, just like a jet fighter compresses the forward air.

The initial acceleration of light up to its maximum speed



Growth of an energy shock wave

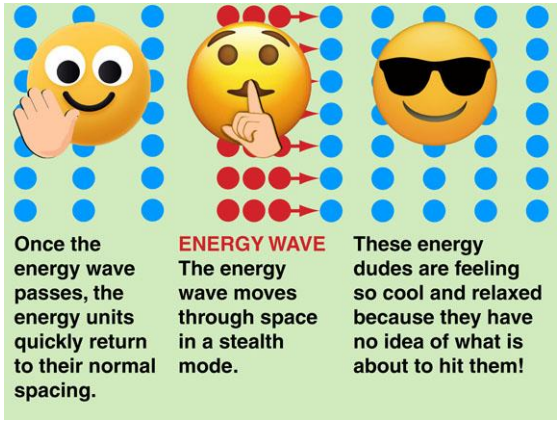
Why does light stop accelerating when it reaches the speed of light?

- Once the energy message reaches the speed of causality, it is now travelling as fast as the forces that were pushing it.
- If the photon ever slows, then it will be given a push to accelerate it back to the speed of causality.
- However, because no force message can travel faster than the speed of causality, there is no force that can push the photon to move faster.

Bobsleigh

Bobsleigh

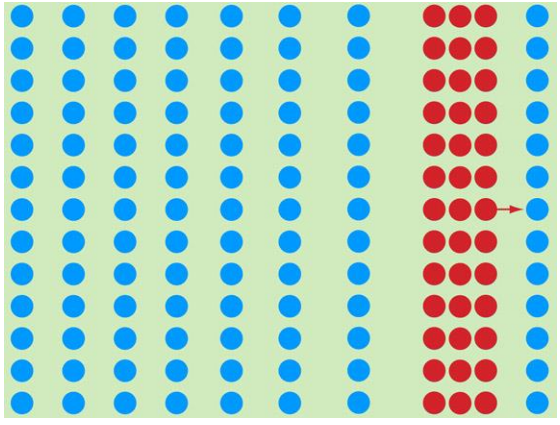
- Who should you pick to be in your bobsleigh team:
  - a runner with the fastest top speed, or
  - a runner with the fastest acceleration?
- Once a runner reach their top speed they can no longer push the bobsleigh, but the runner with the fastest acceleration will reach their top speed faster.
- Similarly, once a photon reaches the speed of causality, it can no longer be pushed by free quantum forces.



Energy shock wave

Light existing glass or water

- The energy wave that is 'light', conducts a surprise attack on the non-concentrated energy that rests in front of it.
- If the photon is ever slowed by something in front of the photon, then the forces behind the photon will help to accelerate the photon back to the speed of causality.
- Therefore, it does not matter how slow the photon travels through glass, once it re-enters air, it will accelerate back to the speed of causality for air (once again, there is no magic here).



Fully developed energy shock wave

Growth of the shock wave

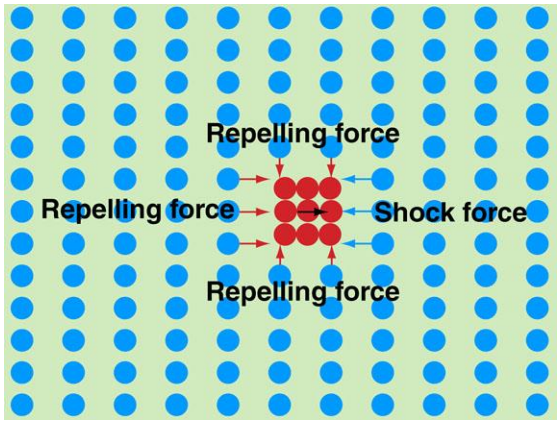
- According to fluid mechanics, a shock wave that is formed at the speed of causality (i.e. the critical velocity) will have a near-straight profile (i.e. level with the photon).
- However, I expect the shock wave could have a curved profile during its initial development.
- The maximum diameter of the shock wave would likely depend on the intensity of the light (i.e. the energy of the photon).

An explanation of why we can see stars at night

Sight

Question

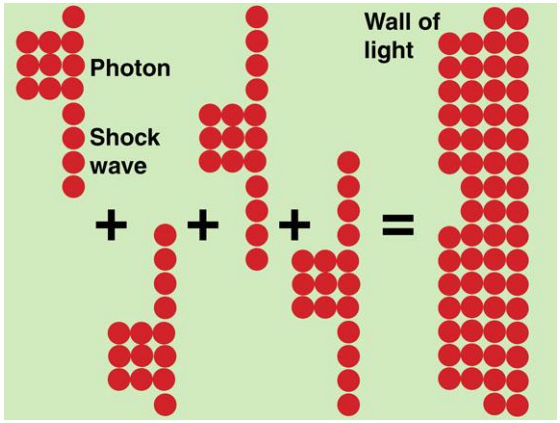
- **Have you ever asked yourself:** How many photons would need to leave our closest star if, after travelling for four light-years, a group of them could arrive in your eye with enough energy to be registered by your brain, yet, if you move just 1 cm to the left, another group of photons would similarly arrive at that location.
- That means there would be enough tightly packed photons to completely fill the surface area of a sphere with a radius equal to four light-years. Wow!



Forces acting on a photon

The effects of gravity on photons

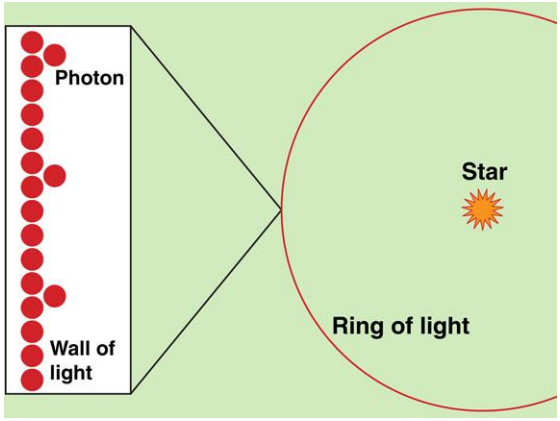
- This paper suggest that a photon is held together with the same force of gravity that holds planets together.
- Without this gravitational effect, the quantum forces contained within the photon would simply disperse into the surrounding aether.
- But what happens to the shock wave?



Overlapping shock waves

The superposition (constructive interference) of shock waves

- As each photon travels on its long journey from a star to your eye, its attached shock wave will, technically, continue to expand, but in reality there will be a measurable limit to this expansion.
- When two shock waves are in close proximity, the same quantum forces that push planets together, also push the shock waves together forming a more intense (i.e. visible), three-dimensional shock wave.

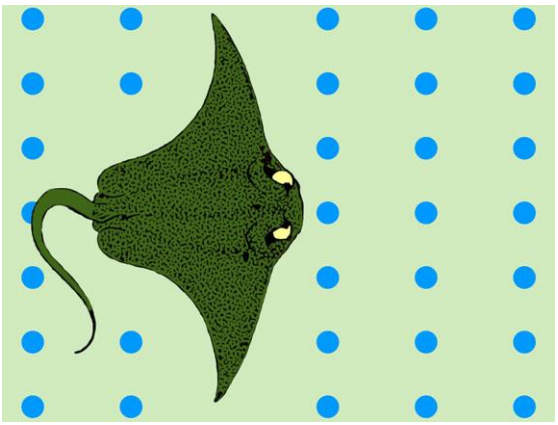


A ring of light projected from a star

The structure of light as it travels vast distances

- Over the vast distances of space, the individual photons and shock waves will eventually join together forming a giant spherical wave (ring) of light.
- Many overlapping shock waves will increase the energy density around the full ring of light to a point where the human eye can detect not just the photons, but also the shock wave.
- These three-dimensional shock waves would carry the full colour spectrum.

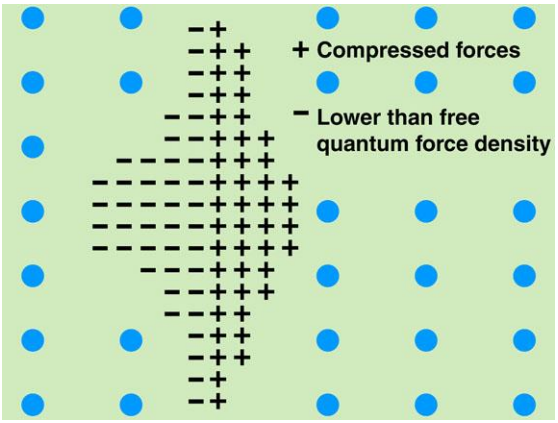
The colour spectrum



Manta ray

Introduction

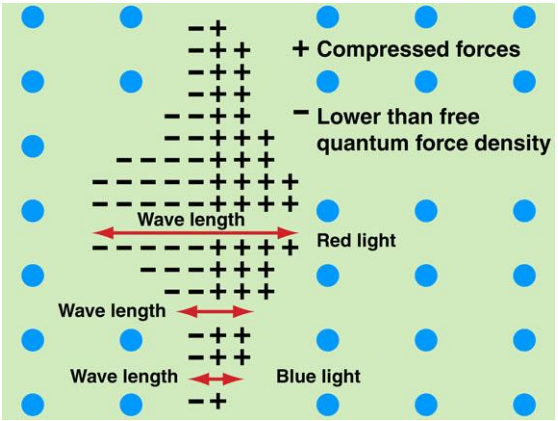
- Readers can imagine a photon and shock wave moving through a field of free quantum forces like a manta ray passing through water.
- (Except, a photon is very much three-dimensional, while the ray looks more two-dimensional.)



Photon and shock wave

A collection of compressed and relaxed quantum forces

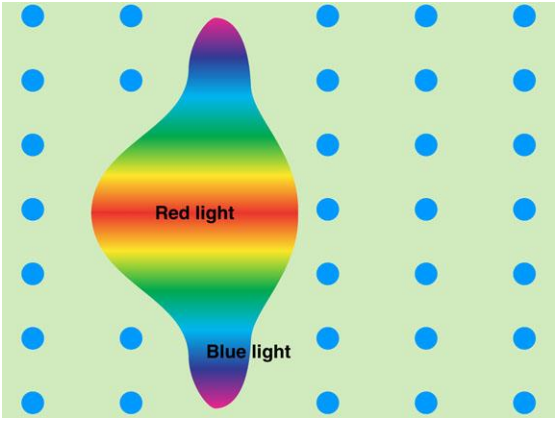
- The photon starts as an isolated concentration ('+' in the diagram) of quantum forces, which begins to form an attached shock wave.
- Behind the photon and shock wave there will be a region of quantum forces where the density of quantum forces is lower ('-' in the diagram) than background levels (i.e. aether).



Wave length

Variable wave length

- The wave length at any location within a photon and shock wave is defined by the length of the compression (+) and trough (-) at that location—just like any other longitudinal wave.
- The three-dimensional shape of a photon and shock wave means that a photon of white light would carry a range of wave lengths, and thus colours.
- In addition, the intensity of the photon can also vary the contained wave lengths.



Colour spectrum

The visible colour spectrum

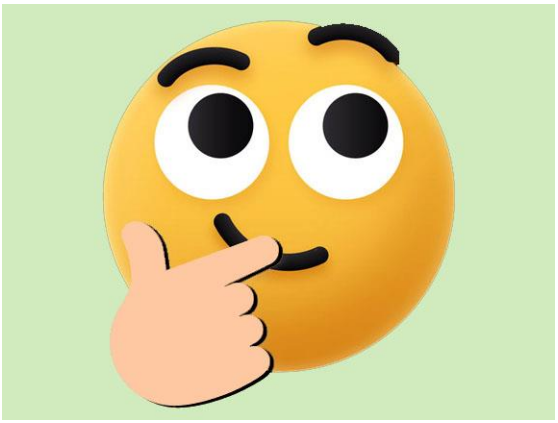
- White light travels with a full range of colours and wave lengths.
- The dispersion of the colour spectrum as light passes through an optical prism is caused by the fact that when a photon approaches an inclined translucent material, it is the 'blue' outer edge of the shock wave that begins to refract first.
- The shape of the shock wave, and therefore its variable wave length, is also likely to influence the degree of refraction.

The refraction of light

I feel so alone

Introduction

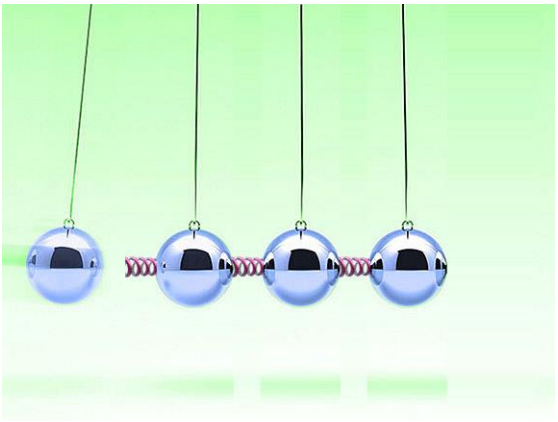
- Einstein based his theories on physics and mathematics, whereas I base my theories on fluid mechanics and wave theory.
- Therefore, when it come to discussion about astrophysics, Einstein wins hands-down.
- However, when it comes to a discussion about wave refraction, diffraction and reflection, I hope I can stand toe to toe with most astrophysicists.



Thinking

The Internet has some strange ideas!

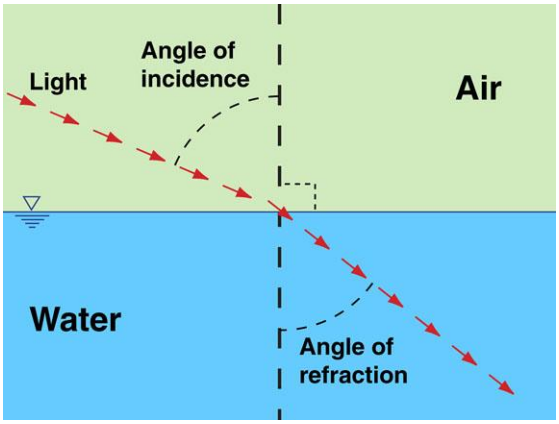
- The refraction of light is not caused by light bouncing off electrons.
- Refraction is not caused by light stopping to have a chat and coffee with particles in the new media.
- Refraction is not caused by soldiers or tanks moving over muddy ground.
- Refraction is also not caused by the interference from the excitation of electrons which may, or may not, cause the generation of magnetic fields.



The slowing speed of causality

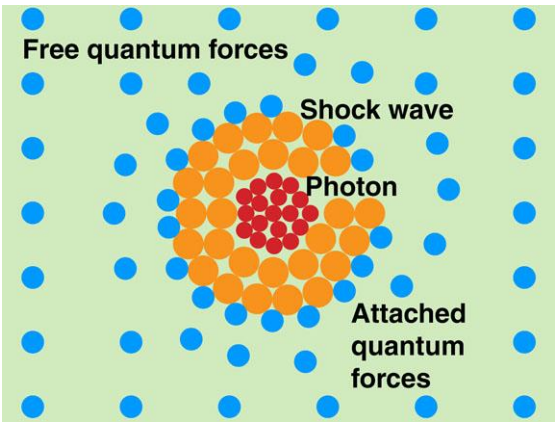
Refraction of light

- The primary cause of the refraction of light is the same as it is for the refraction of water waves—that being the partial slowing of the energy wave.
- The speed of the energy wave associated with a photon is governed by the speed of causality, which reduces as the density of free energy (quantum forces) reduces.
- The density, or distribution, of free energy reduces as the density of concentrated energy increases (really important!).
- As the density of a translucent material increases, the density of free energy inside the material must decrease, which means the speed of causality of the free energy component of the material must decrease, which means the speed of light within that material must decrease.
- Even though an ocean wave appears to move in one direction, the pressure force radiates out in three-dimensions from any point within the wave.
- Similarly, the energy message of a photon radiates out in 3-dimensions, and it is this 'force' that is slowed in a non-symmetrical way causing the refraction of light.



Refraction of light

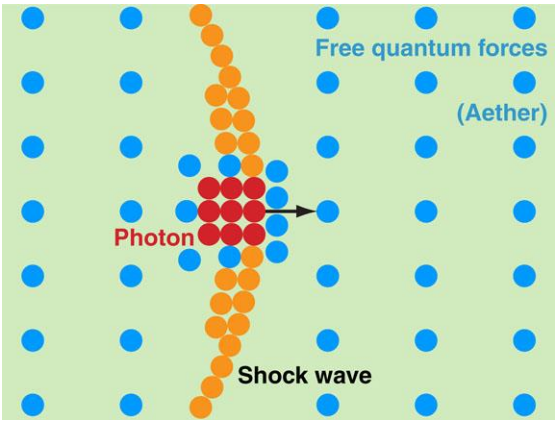
The reflection of light



Photon and shock wave (front view)

Introduction

- A photon consists of:
  - a central core of compressed quantum forces, which is likely to be near-spherical
  - an attached shock wave, that is likely to have a circular, shield-like shape
  - attached quantum forces (unsure) that may first attach, then detach, from the photon.



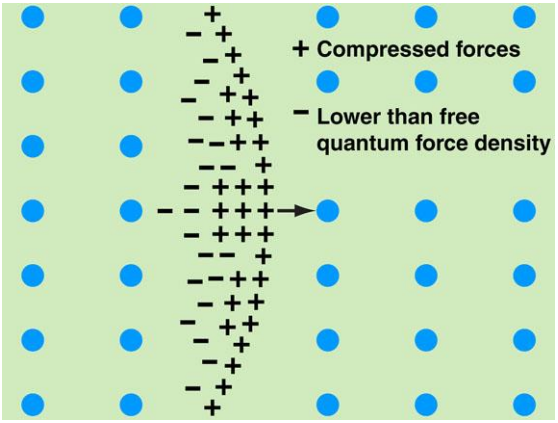
Photon and shock wave (side view)

Side view of a photon

- In a side view, a photon and shock wave would likely look similar to a frisbee, flying saucer, or manta ray.

Notes:

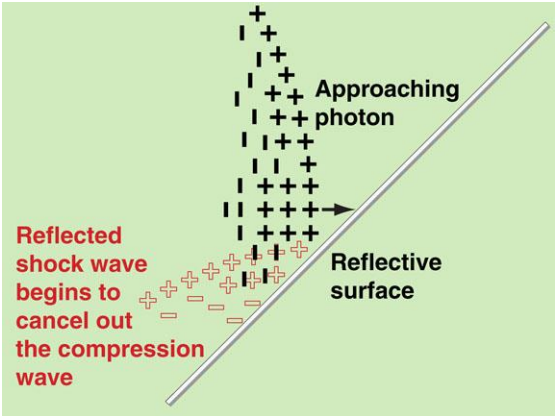
- The term 'compressed quantum forces' refers to quantum forces existing in a concentration greater than background levels (i.e. aether).
- The term 'uncompressed quantum forces' refers to quantum forces existing in a concentration lower than background levels.



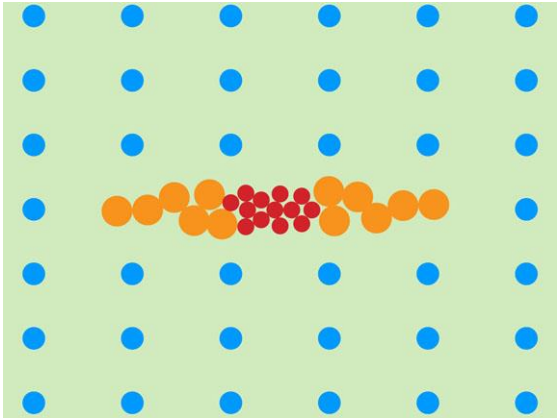
Compressed and uncompressed forces

Compressed and uncompressed elements

- Thus a photon consists of a shield of compressed quantum forces followed by a region of uncompressed quantum forces.
- When a photon reflects off a surface, the compressed region of the photon will fold back onto the uncompressed region.
- The end result of this interaction between compressed and uncompressed forces is a new photon that is more two-dimensional, than the original three-dimensional photon (in front view).



The reflection of a photon



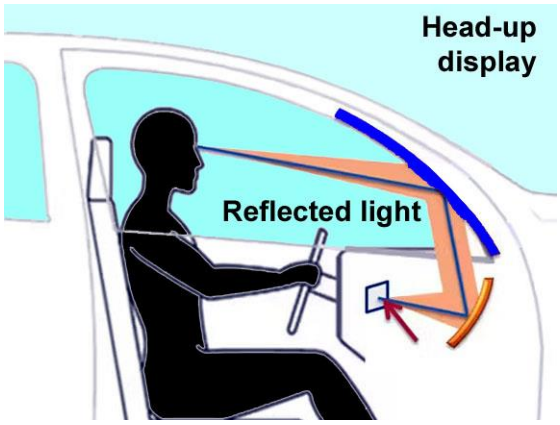
Initial reflected photon (front view)

The polaroid effect on head-up displays

Head-up display

Introduction

- Some cars are equipped with a head-up display that reflects off the windscreen.



Projection of a head-up display

Reflected image

- The reflection of this light causes the photons to have a distorted, near-horizontal alignment.

View through polaroid sunglasses

Image viewed through polaroid sunglasses

- Polaroid sunglasses are designed to filter that part of the light that has a horizontal alignment.
- This means that if drivers are wearing polaroid sunglasses, their vision of a head-up displace will largely disappear (i.e. the head-up display will appear very dull).

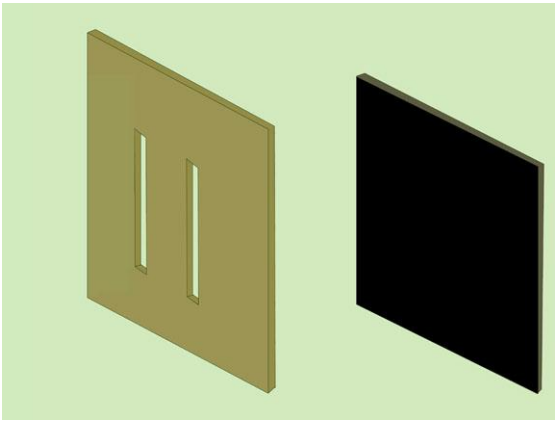
View through tinted sunglasses

Image viewed through tinted sunglasses

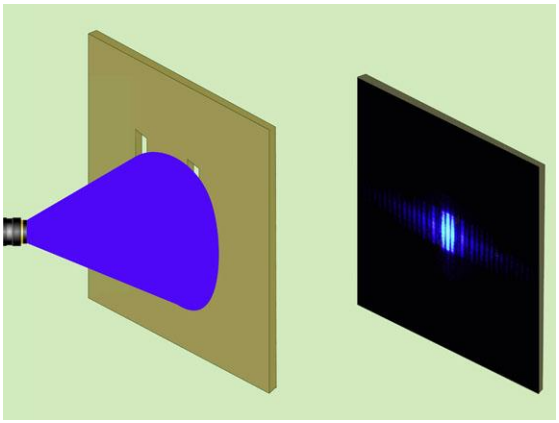
- The solution to this problem is to wear tinted glasses, rather than polaroid glasses.

7. The Double Slit Experiment

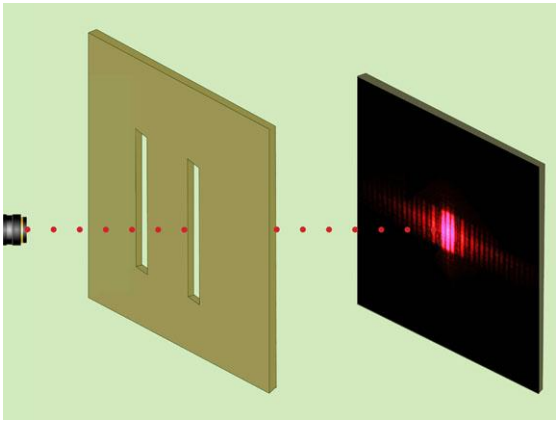
The double slit experiment



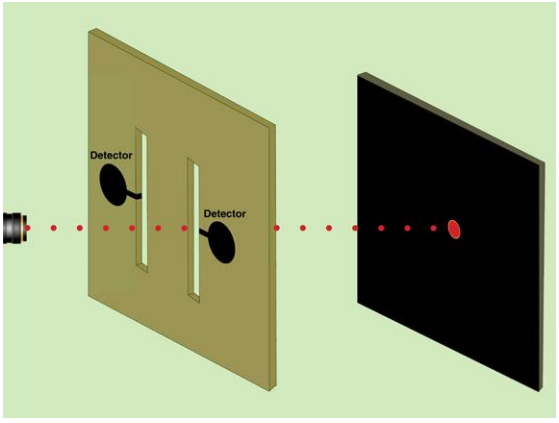
Test set-up



Blue-light torch on double slits



Projection of single photons



Counting each photon

The double slit experiment

- The double slit experiment involves projecting light onto two narrow slits cut into a screen, which allows some light to be projected onto a back screen.
- The double slit experiment can also be performed with a single fibre (e.g. hair).
- The experiments are normally performed with a single colour of light in order to:
  - reduce the rainbow effect (because colours travel in the shock wave)
  - improve the sharpness of the image.

Results achieved from a beam of light

- If a single beam of light is projected towards the two slits, then the projected image will be:
  - a series of glowing bars of light
  - higher intensity light in the centre, flanked by much lower intensity bars.
- If a beam of light is projected onto just one slit, then the projected image will be:
  - a single column (bar) of light parallel with the slit.

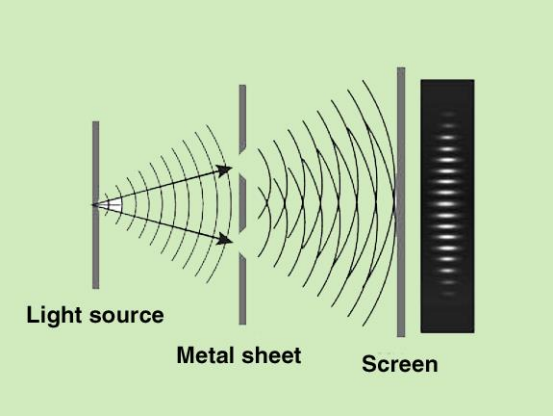
Results achieved from the projection of photons sent one at a time

- If a series of individual photons are projected towards the two slits, then the projected image will be:
  - similar to that produced by a beam of light.
- If a series of individual photons are projected towards a single slit, then the projected image will be:
  - a single dot, or column of light, depending on the angle of projection of each photon.

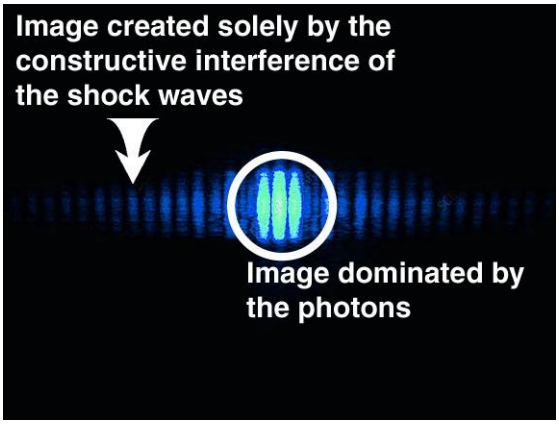
Results achieved when the photons are being watched

- If a detector is placed on one of the slits to count the photons passing through that slit, then the projected image will be:
  - a single dot or column of light.
- If detectors are placed on both slits, then the projected image will be:
  - the same outcome as above.
- The claim being that light reacts to being watched—**Yeah, right!** This is all part of the **magic** of light we are told to accept.

Explanation of the double slit experiment



Traditional illustration of wave conditions



Interference pattern

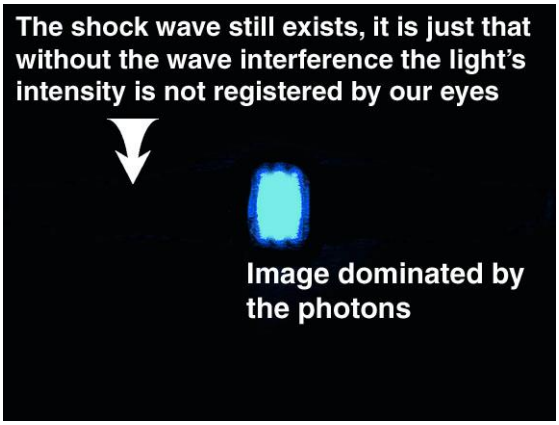
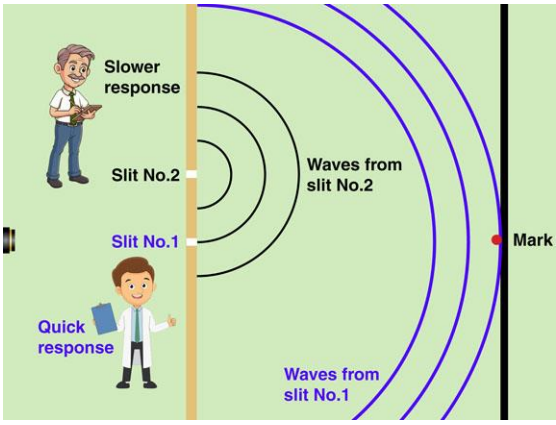


Image generated by a single slot



Phase shifting

A question

- **Question:** What exactly are the semi-circular lines suppose to represent on traditional double slit diagrams (left)—are these lines suppose to represent electromagnetic waves?
- **Answer:** I suggest that these lines mimic what 2D water waves look like if they experience interference.
- However, by accident, these lines do represent the wave pattern of the energy shock waves that actually produce the interference pattern.

Beam of light projected onto <u>two</u> slits

- If a beam of light is projected onto two slits, then:
  - the photons will travel straight towards the back board (screen).
  - a few very weak energy shock waves will be developed by the photon in the beam of light, which will pass through both slits
  - some of the overlapping shock waves that hit the back board will have enough intensity to be visible.

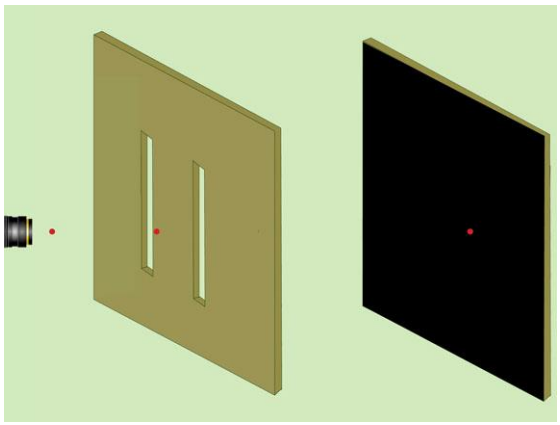
Beam of light projected onto <u>one</u> slit

- If a beam of light is projected onto just one slit, then:
  - a portion of the light will be projected straight onto the back board
  - a series of very weak shock waves will reconstruct after the beam of light passes through the slit, but these waves will not build a constructive interference pattern, and thus will not build the necessary intensity to become visible.

The 'observer' effect

- I cannot state with certainty what is happening without understanding the equipment that is being used to count the photons.
- However, the obvious explanation is that the detection equipment causes an ever-so-slight delay in the photons, and given the light speed of the shock wave, this delay could result in a phase shift occurring between the two sets of shock waves, even if a detector is placed on both slits.

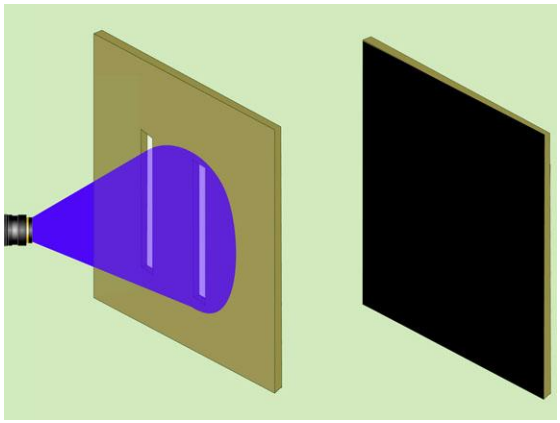
The explanation of a single photon test



Projection of individual photons

Initial travel of a single photon

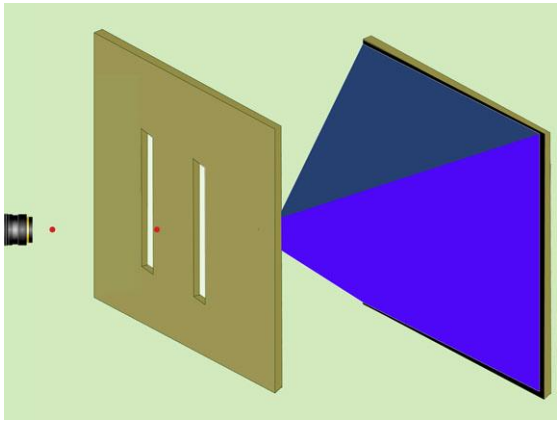
- Individual photons will pass through whichever slit that they are aimed at.
- Nothing magic to see here!



Initial energy shock wave

Initial shock wave

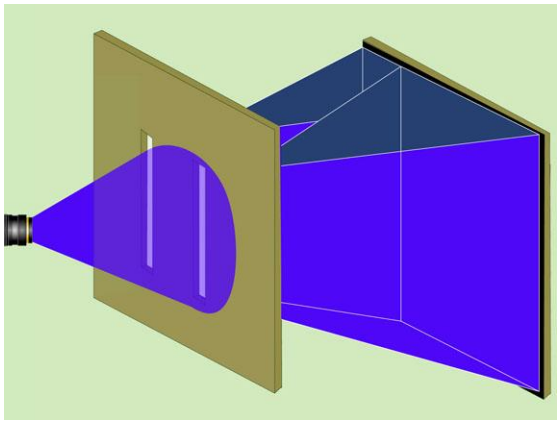
- Each photon will generate it own energy shock wave, which will likely expand to cover both the slits.
- What is important to note is the vertical height of the generated bars of detected light (refer to the cover image of this document)—this vertical spread of the light is important if the source of light is a laser.
- The blue cone shown in the diagram represents the initial shock wave, not a beam of light.



Secondary shock wave

Second photon-generated shock wave

- When the photons pass through the first slit they will be stripped of most of their initial shock wave.
- The photons will then start to rebuild a new shock wave.
- Again, the blue rectangular pyramid shown here represents the rebuilding of a new shock wave—one for each photon, independent of whether the photons are sent one at a time, or as a beam of light.

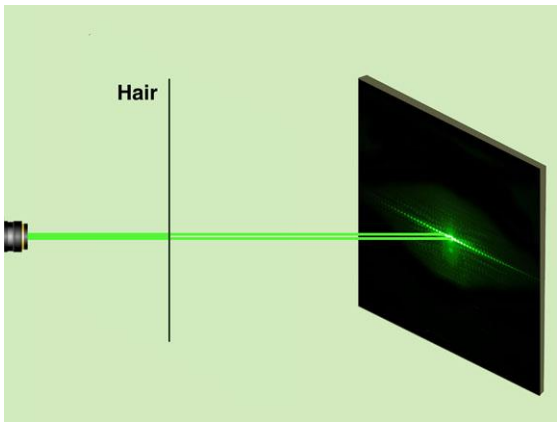


Shock waves formed from front wave

The shock wave-generated shock waves

- When the initial shock wave hits the two slits, most of the shock wave will be absorbed or reflected.
- Those parts of the shock wave that pass through the two slits will begin to expand once the shock wave has passes through the slits.
- These secondary shock waves will be much weaker than the initial shock wave.
- Constructive interference of <u>all</u> the shock waves will generate the <u>several</u> parallel columns of light that are observed.

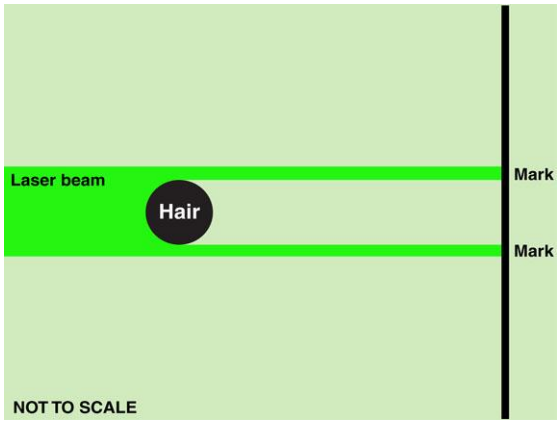
An explanation of the single hair test



Split ray test using a human hair

Some facts

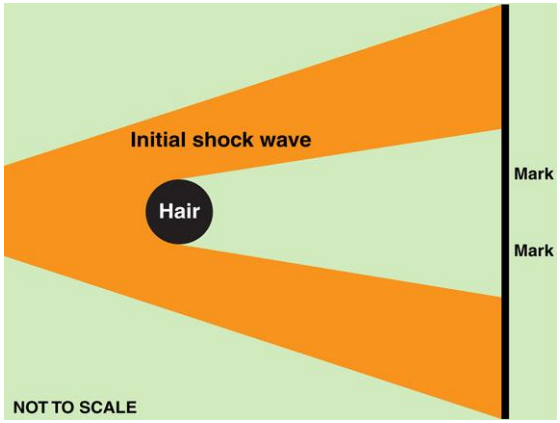
- The single hair experiment works a bit differently from the double slits in that two semi-circular shock wave are produced each side of the hair (the shock waves are not able take the shape of a slit).
- Each photon within the beam of light will develop each of these shock waves.
- In order to explain the single hair experiment I have chosen to use top view diagrams in order to better display the multiple shock waves.



Laser beam

Beam of light

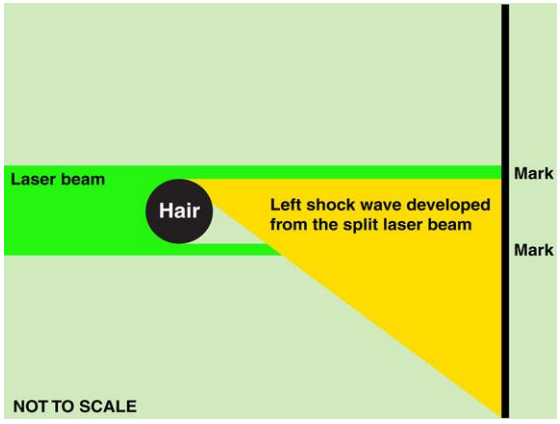
- The parts of the laser beam that can pass by the hair, will project straight onto the screen.



Initial shock wave

Initial shock wave

- Each photon in the laser beam will build its own energy shock wave, and many of these shock waves will join with each other.
- This initial shock wave will be partially blocked by the hair.

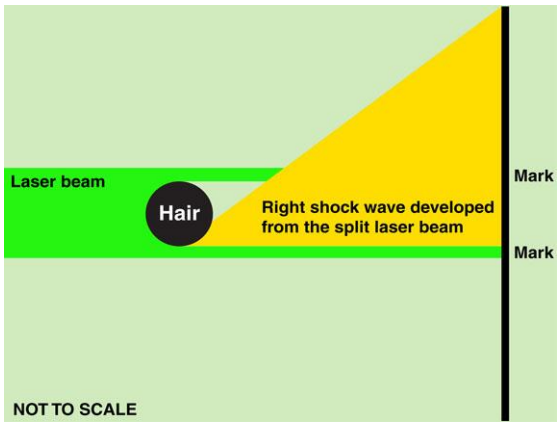


Building a new shock wave

Building a new shock wave

- The split beam of light will start to construct a new energy shock wave behind the hair.
- Only the left side is shown here.

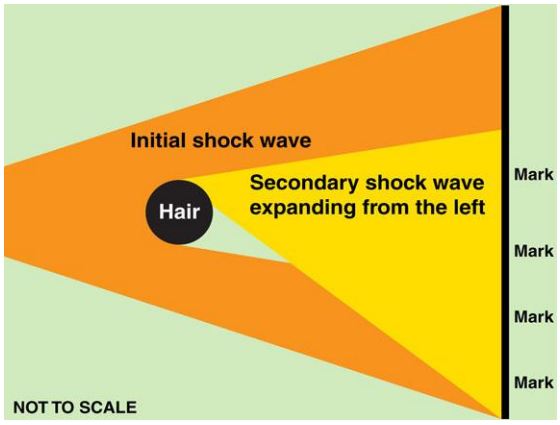
An explanation of the single hair test



Building a new shock wave

Building a new shock wave

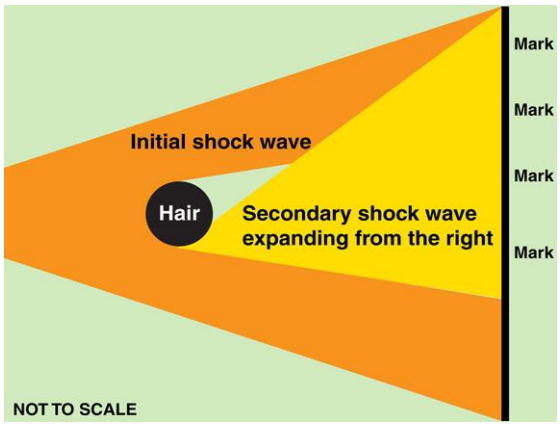
- Similar to that discussed for the previous image, but showing the right-hand side of the beam of light.



Building a new shock wave

Shock wave building a new shock wave

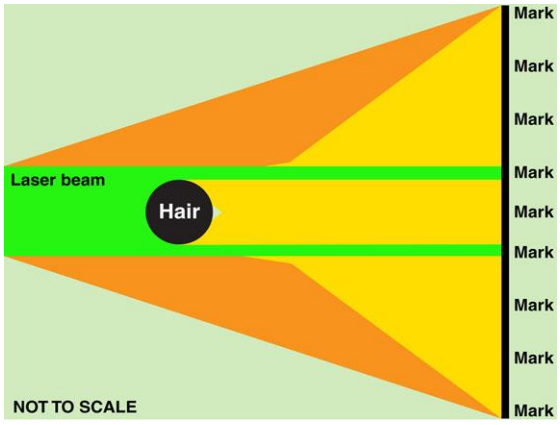
- The split initial shock wave will also begin to expand behind the hair.
- Only the left side is shown here.



Building a new shock wave

Shock wave building a new shock wave

- Similar to that discussed for the previous image, but for the right-hand side of the beam of light.
- Note; only the existence of these multiple shock waves can explain the **many** parallel bars of light, which the water wave theory cannot.

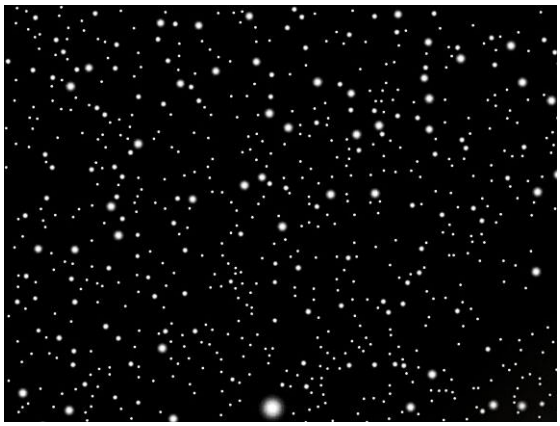


Overlapping energy shock waves

Final outcome

- This complex structure of light produces several evenly-spaced bars of light.
- Each photon within the beam of light will develop all five shock waves, so even though each shock wave has a **very** low intensity, thousands of small intensity glows can join to make a visible glow.
- **If you are looking for a challenge;** try to figure out an explanation of the triple polaroid filter experiment before reading the next chapter.

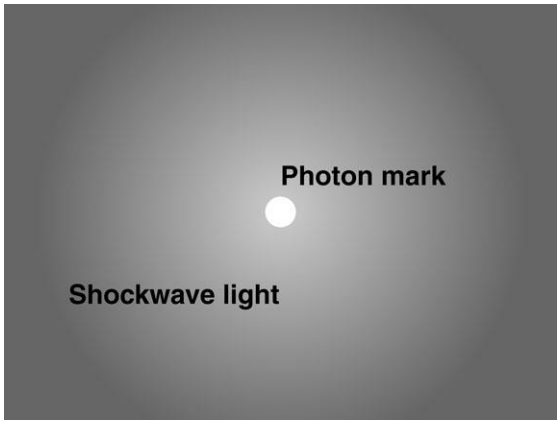
The properties of energy shock waves



Stars

Why can't we see a shock wave?

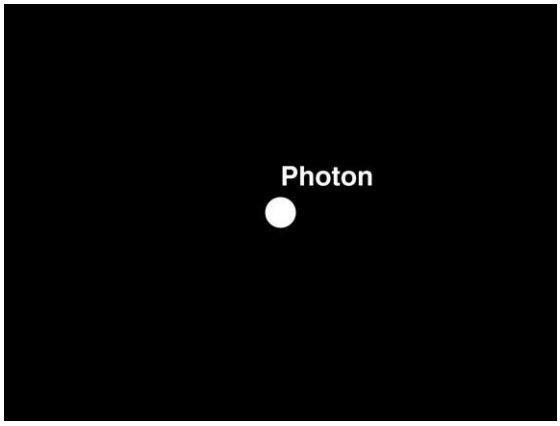
- **Question:** If an energy shock wave is just concentrated energy, and a photon is a localised concentration of energy, then why don't we see the shock wave?
- **Answer:** In some circumstances you do see the shock wave.
- When you look at stars at night, mostly what you are seeing is the shock wave.
- In the double slit experiment you can see evidence of shock waves.
- When you see a colour spectrum you are seeing evidence of shock waves.



Energy of a photon and shock wave

Concentrated energy

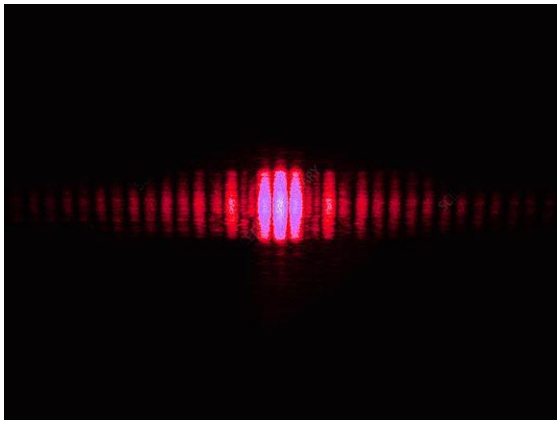
- If you had an instrument that could register any level of concentrated energy (i.e. any light intensity), and you projected one photon at a sensor, then the image you would likely get is shown here.
- Technically, the term 'light' only applies to an energy concentration that can be observed by the human eye, not the light detected by a sensor.



Light observed by the human eye

Visible light

- If we look at the same image with a human eye, the sensors in the eye will only register the bright light of the photon (or should I say, multiple photons).

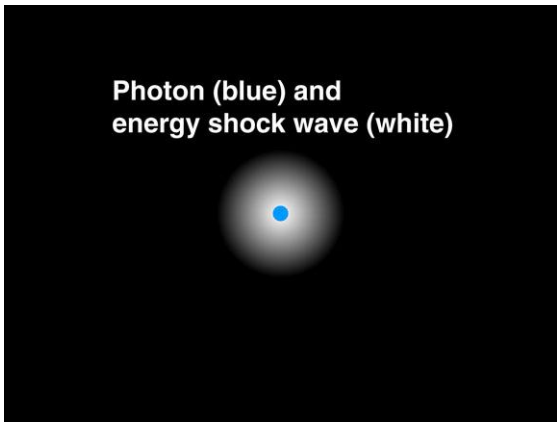


Double slit experiment image

Relative energy

- We can get an idea of the difference in energy between a photon and shock waves when we look at the image generated by the double slit experiment.
- The high intensity light of the photon is visible in the centre.
- The intensity of the shock wave effect adjacent to the photon's mark is much less than the photon.
- Again, note the vertical height of each bar of light.

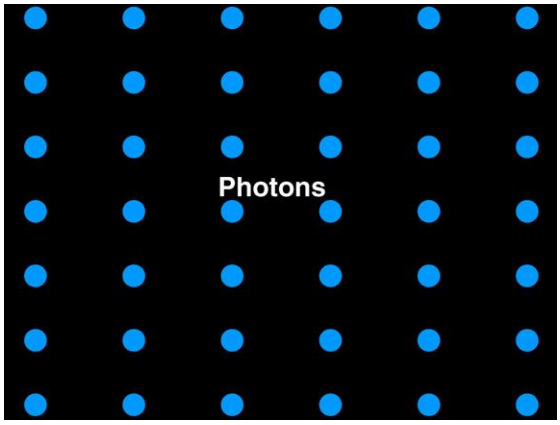
The properties of energy shock waves



Assumed single photon and shock wave

Expand the view of a single photon and shock wave

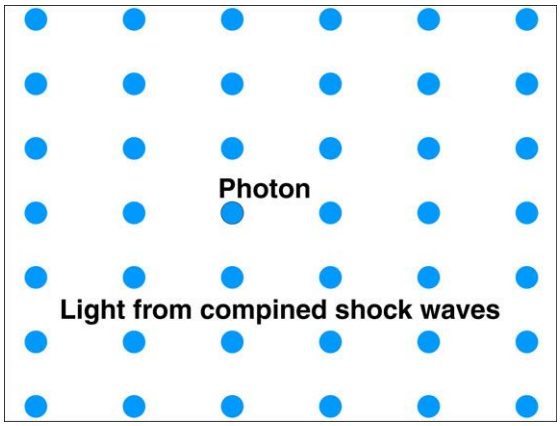
- If we expand the previous image of a photon and its shock wave, and we pretend the shock wave has only a limited radius, then we may get the image shown left.



Photons without the shock wave effect

A cluster of photons

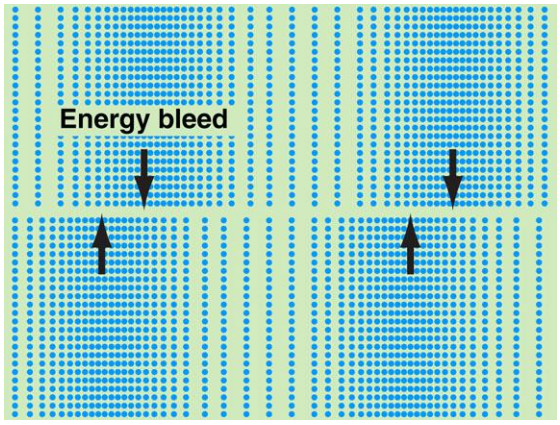
- If we now consider a cluster of photons arranged as shown left.
- The position of these photons are shown without the light that could be generated by their associated shock waves.



Photons with the shock wave effect

Image produced by a cluster of photons

- If we now apply a shock wave circle to each of these photons, and we superimpose their energy, then we end up with a wall of light.
- As photons travel from a distant star to your eye, the photons spread further and further apart.
- However, all the shock waves overlap each other, and eventually a three dimensional sphere of light radiates out from the star, which allows the light to reach every corner of space.



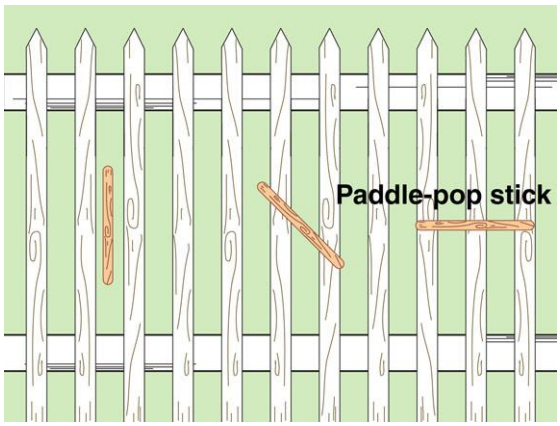
Merging compression waves

How do all these individual shock waves get in phase with each other?

- A shock wave is just another example of compressed quantum forces (or energy, if you prefer).
- As discussed in the final chapter, free quantum forces apply forces to concentrated quantum forces that:
  - stabilise a concentration
  - try to force two concentrations together.
- Thus free quantum forces push shock adjacent waves together.

8. Polarisation and the Triple Filter Experiment

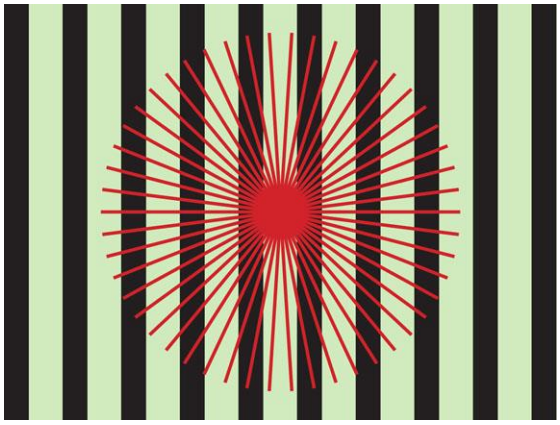
If light were to travel as a transverse wave



Horizontal paddle-pop stick

Introduction

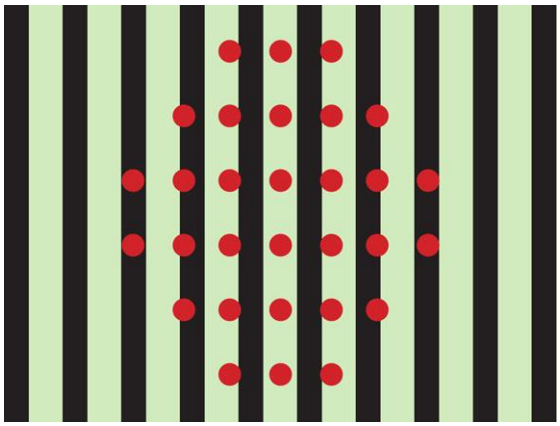
- Some writers have compared the filtering of light to the passing of a paddle-pop stick through a slatted fence.
- I disagree with this analogy:
  - if a photon did travel as a transverse wave, then at the instant the photon arrived at the filter, it would exist only as a single point, not as a 2D wave
  - and, the paddle-pop analogy suggests that far more than 50% of the light would be filtered.



Photons arriving in a starburst pattern

Light as a transverse wave

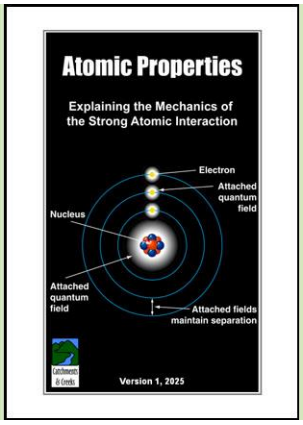
- If light did travel as a transverse wave, and these waves arrived in a 360-degree spectrum, then it would be reasonable to expect that a polaroid filter would filter more than 50% of the light.



Photons approaching a vertical filter

Light as a compression wave

- If light travelled as a longitudinal compression wave, then it would be reasonable to expect that a polaroid filter would filter around 50% of the light.

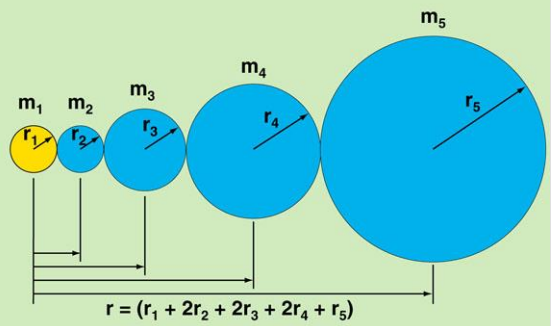


Atomic Properties, 2025

The collapse of divided photons

- If a filter removes a significant portion of an individual photon, then the divided photon will collapse and convert into background aether.
- Based on my investigations into the weak and strong atomic interaction, it would appear that if the primary mass (m_1) is close to the size of the secondary mass (m_2), then a net force of attraction will collapse, which appears to explain the collapse of a half photon—the earlier mathematics is repeated over the page.

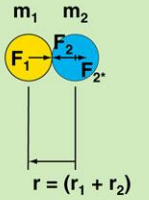
This is a repeat of a previous page that demonstrates the mathematics



Electron and attached quantum forces

$$F_1 = F_2 - F_{2^*} + F_3 - F_{3^*} + F_4 - F_{4^*} + F_5 - F_{5^*} + \text{etc}$$

$$F_2 = \frac{G.m_1.m_2}{(r_1 + r_2)^2}$$



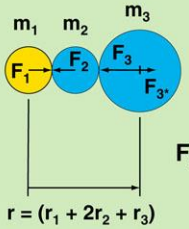
$$F_{2^*} = \sum \frac{(G.m_2.m_n)}{(r_2 + 2r_3 + 2r_4 + 2r_5 \ldots)^2}$$

F_{2^*} = sum of forces of attraction to outer quantum forces

Forces acting on mass-2

$$F_1 = F_2 - F_{2^*} + F_3 - F_{3^*} + F_4 - F_{4^*} + F_5 - F_{5^*} + \text{etc}$$

$$F_3 = \frac{G.m_1.m_3}{(r_1 + 2r_2 + r_3)^2} + \frac{G.m_2.m_3}{(r_2 + r_3)^2}$$

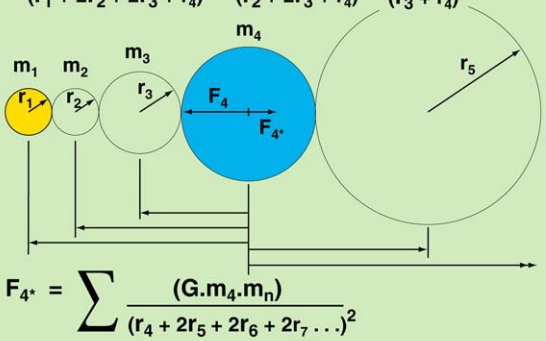


We could assume $m_2 = m_3$

$$F_{3^*} = \sum \frac{(G.m_3.m_n)}{(r_3 + 2r_4 + 2r_5 + 2r_6 \ldots)^2}$$

Forces acting on mass-3

$$F_4 = \frac{G.m_1.m_4}{(r_1 + 2r_2 + 2r_3 + r_4)^2} + \frac{G.m_2.m_4}{(r_2 + 2r_3 + r_4)^2} + \frac{G.m_3.m_4}{(r_3 + r_4)^2}$$



$$F_{4^*} = \sum \frac{(G.m_4.m_n)}{(r_4 + 2r_5 + 2r_6 + 2r_7 \ldots)^2}$$

Forces acting on mass-4

Introduction

- On this page I will describe the type of mathematics that demonstrates how the attached quantum forces ultimately generates a net force of attraction.
- This is NOT the correct mathematics, because in this example I have assumed that the effective size of the quantum force increases in proportion to distance, which is not correct (I believe).
- The correct analysis requires consideration of the mechanics in three dimensions—too hard for me!

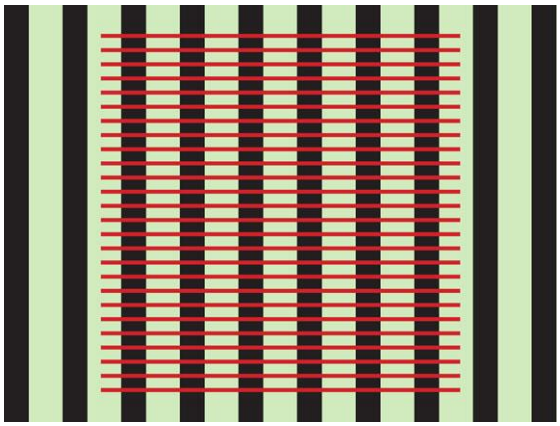
Forces acting on primary mass (m_1) and first secondary mass (m_2)

- There is a repelling force that exists between the primary mass (m_1) and the first attached quantum force (m_2).
- The primary mass can be anything from an electron to a planet, or a black hole.
- Key to this analysis is the relative size of the primary mass (r_1) compared to the attached quantum forces (r_2, r_3, r_4, etc.).
- For an electron; $r_1 > r_2$.
- For a nucleus; $r_1 >>> r_2$.
- The repelling force (F_2) that exists between the primary mass (m_1) and the first attached quantum force (m_2) is governed only by masses m_1 and m_2.
- The repelling force (F_{2^*}) that exists between the first attached quantum force (m_2). and the outer attached quantum forces involves mass m_2 and all the masses outside m_2.
- This same analysis is repeated for all the attached quantum forces until the outer most attached quantum force has an inward repelling force equal to the background repelling force of free aether.

The effect of particle size

- For a mass the size of our Sun, the attached quantum forces will extend beyond Pluto before the attached quantum force 'pressure' equals the background aether, after which, the net force converts to the repelling force of aether.
- For a primary mass the size of an electron, the distance from the electron before the net force converts from attraction to repelling in microscopic, which means electrons repel each other, rather than attract each other.

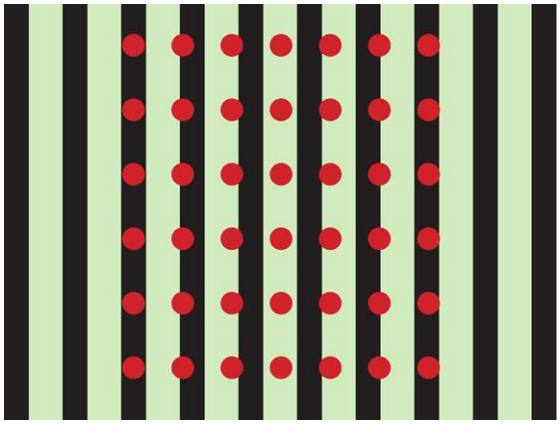
If light were to travel as a transverse wave



Horizontal paddle-pop stick

Introduction

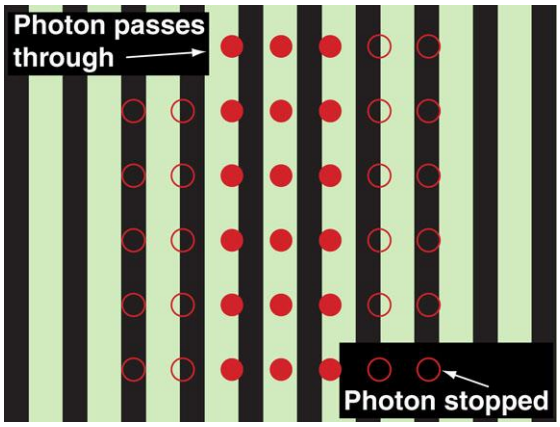
- If light did travel as a transverse wave, and:
  - if the light approaching a polaroid filter was reflected light with a dominant horizontal alignment (shown here)
  - then logic would suggest that most of the reflected light would be stopped
  - which is the case for polaroid sunglasses.
- So, on first inspection, the transverse wave theory does sound reasonable.



Starburst pattern approaching a filter

Looking at individual photons

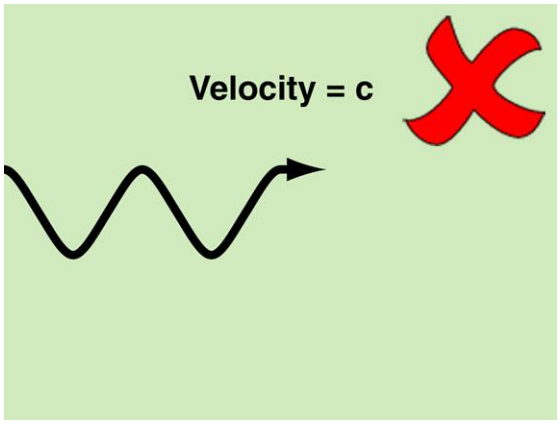
- However, if we accept that each photon would exist as a single virtual particle at the time that it arrived at the filter, then the above image would convert to something like the image shown left.
- Here, each red dot represents just one photon.



Photons at any given 'instant'

Filtered light

- If a polarised filter filtered the above photons, then the outcome would likely be around 50% filtration, not the near 100% filtration that is observed for polaroid filters.

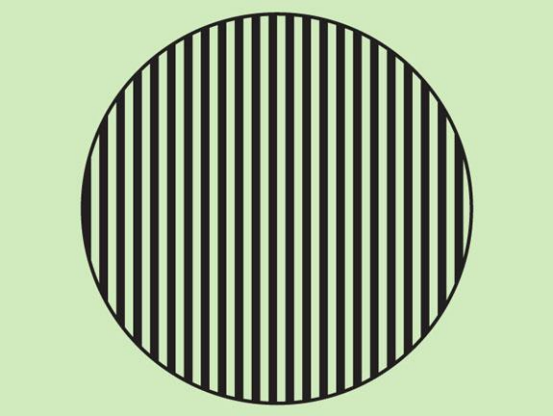


Light is <u>not</u> a transverse wave

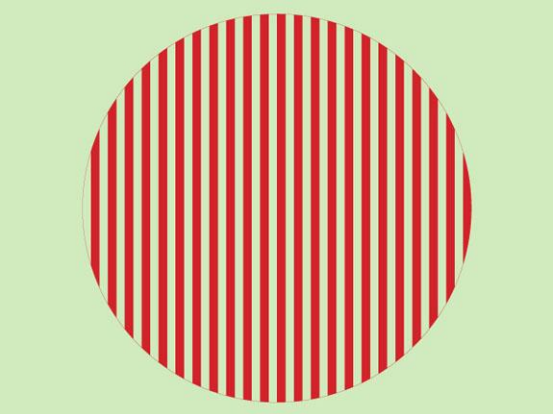
Not a transverse wave

- So, based on my understanding of physics and light, the transverse wave theory does not appear to support our observations of polaroid filters.

Double filter experiment

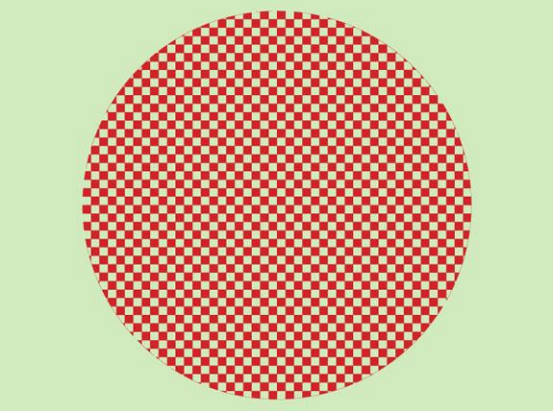


Vertically aligned filter (50%)

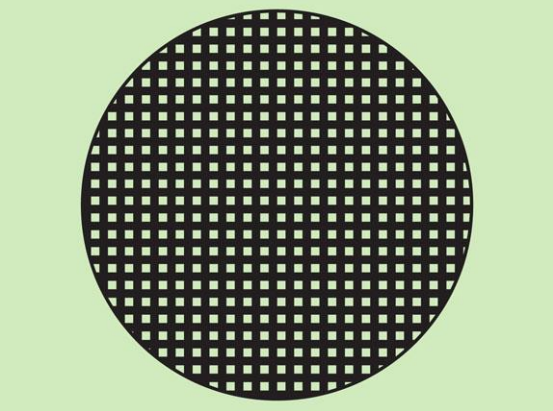


Polarised light (shown in red)

Horizontally aligned filter (50%)



Theoretical light passing the filter



Combine filters (25% blockage)

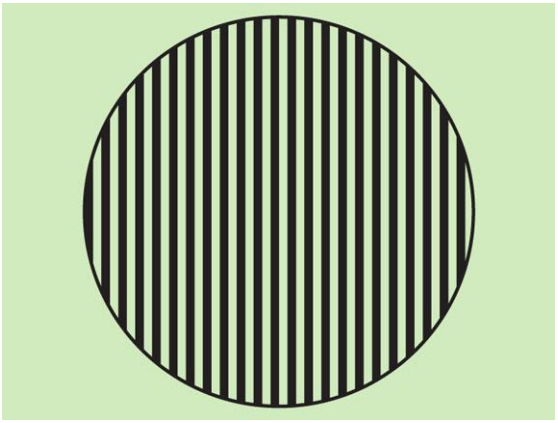
Light passing through a vertical filter

- If we were to send a beam of light towards a polaroid filter, then it would be expected that around 50% of the light will be filtered.
- The image (left) shows a vertically aligned polarised filter.
- It would appear that some people believe that if two polarised filters are held at 90-degrees to each other, their combined silhouette would represent a 100% shadow; not the 75% coverage that actually occurs (refer to bottom image).

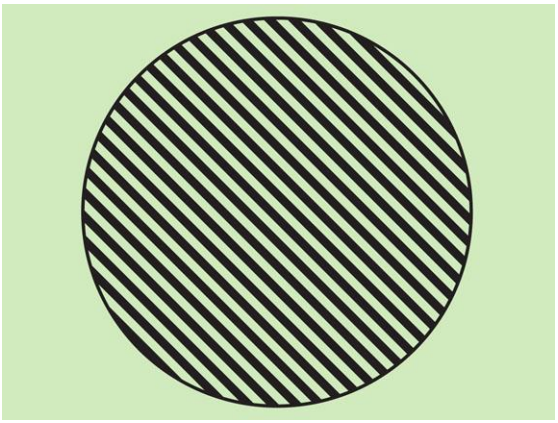
Polarised light

- The image shown left, represents the potential filtered (red) light passing through a vertical filter.
- If this filtered light were to be projected onto a horizontal filter (below left), then it would be reasonable to expect that the passing light would look something like that shown below (bottom left).
- This theoretical projection of light represent around 25% of the original light.
- However, we know from experiments that two miss-aligned polaroid filters will stop nearly 100% of the light.
- The reason for the near-100% filtering is:
  - each photon that passes through the second filter will lose around 75% of its shock wave
  - each of these photons are still travelling at the critical velocity, so the photons will try to rebuild their shock wave
  - however, if this rebuilding process takes too much energy from the photon, then the photon will collapse, and the light will cease to exist.

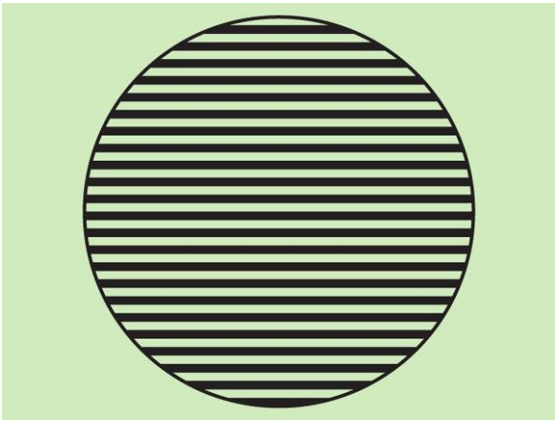
Triple filter experiment



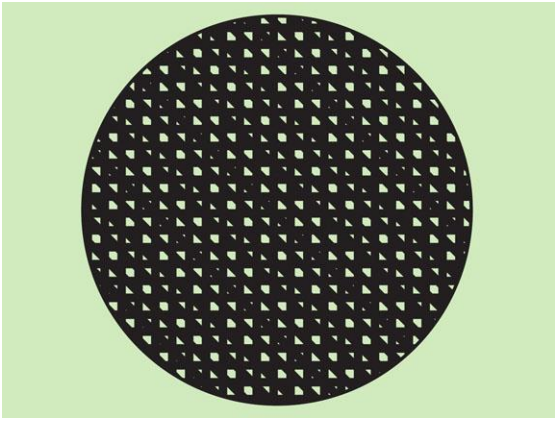
First filter: Vertically polaroid (50%)



Second filter: Tilted polaroid (50%)



Third filter: Horizontally polaroid (50%)



Combined filters (12%)

First filter

- The triple filter experiment involves passing light through three polaroid filters; each filter rotated 45-degrees from the previous filter.
- Unlike the double filter experiment, which blocks almost 100% of the light, the triple filter experiment shows that approximately 12% of the light is able to pass through the three filters, even though the net 12% unobstructed passage is half of the unobstructed passage available on the double filter experiment.

Second filter

- If the first filter is vertical (top left), then the second filter (left) will be at 45 degrees.

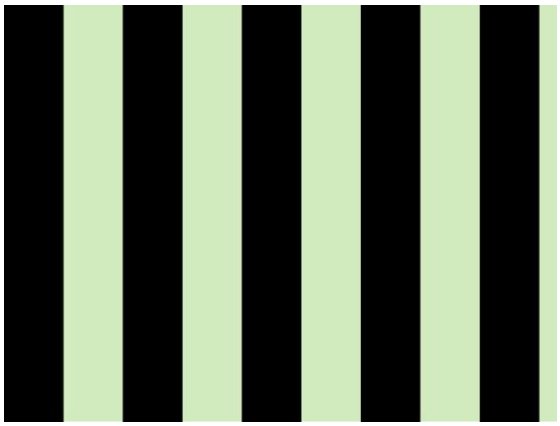
Third filter

- If the first filter is vertical, then the third filter (left) will be horizontal.

Image of combined filters

- The net clear area of the three filters is around 12 to 13% depending on the positioning of each filter.
- The conventional theory of light cannot explain this counter-intuitive outcome of around 12% of the light passing through the three filters.
- However, the outcome can be explained by the longitudinal compression wave theory of light that is being proposed within this document.

Explanation of the triple filter experiment



(a) Vertical filter (54%)

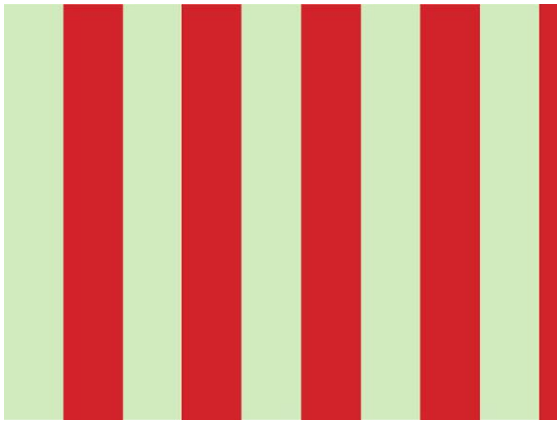
Introduction

The following images represent a magnified view of a polarised filter.

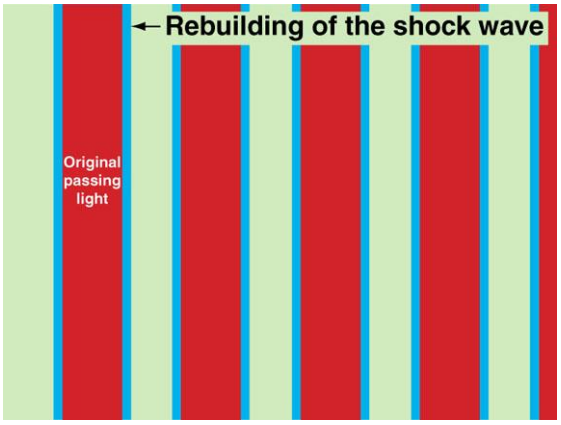
(a) The first image represents the first vertical filter.

(b) The net image represents the light (red) immediately after it passes through the vertical filter.

(c) Image (c) represents this filtered light beginning to rebuild its shock wave (blue), which has increased the total light to 61%.



(b) Light passing through filter (46%)



(c) Rebuilding of the shock waves (61%)

(d) Expanded light all shown in red (61%)

Second (tilted) filter

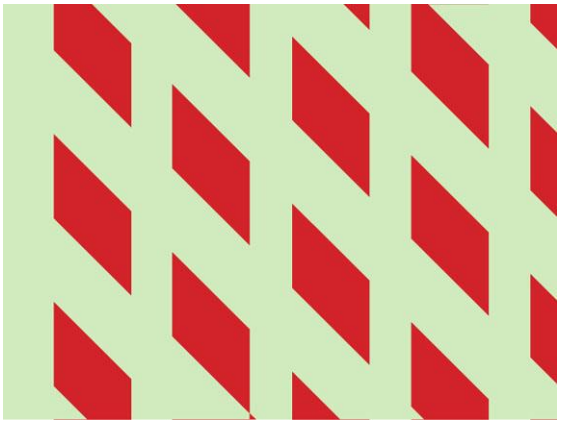
(d) Represents the total light approaching the second filter. This light is the total of the red and blue regions shown in image (c).

(e) Image (e) represents the expanded light shown in (d) as projected onto the second (tilted) filter.

(f) Image (f) represents the amount of light (31%) that is expected to pass through the second filter.

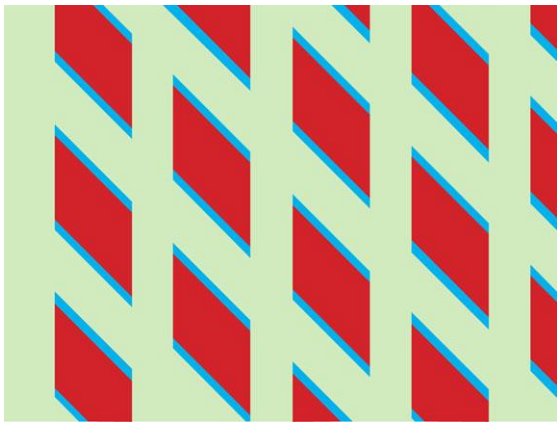
The percentages are only estimates based on an assumed growth of the shock waves.

(e) Light projected onto the second filter



(f) Light passing through the filter (31%)

Explanation of the triple filter experiment



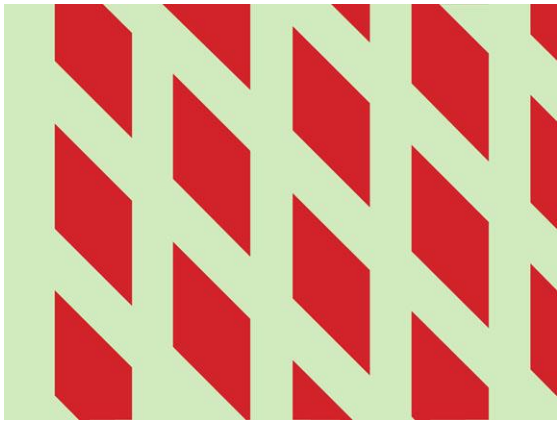
(g) Rebuilding of the shock waves

Light passing through the second filter

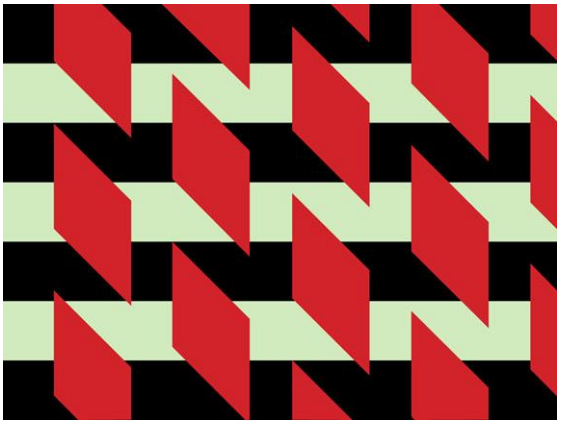
(g) Image (g) represents the rebuilding of the various shock waves (blue) from 31% (f) to 39% (g), but this is based on my guess as to how rapidly the shock wave is rebuilt.

(h) Image (h) represents the total amount of light approaching the third filter. This light is the total of the red and blue regions shown in image (g).

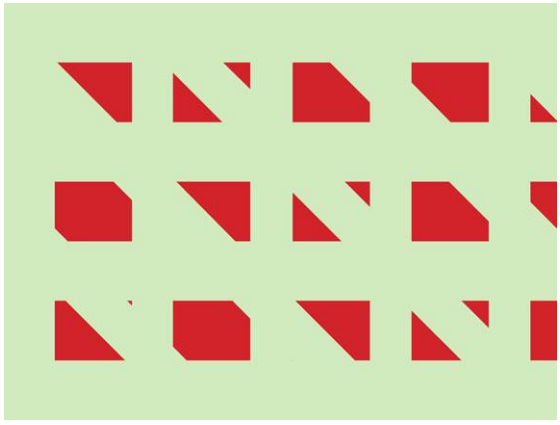
(i) Image (i) Represents the rebuilt light approaching the third and final filter. This final filter is aligned horizontally.



(h) Expanded light all shown in red (39%)



(i) Light projected onto the third filter

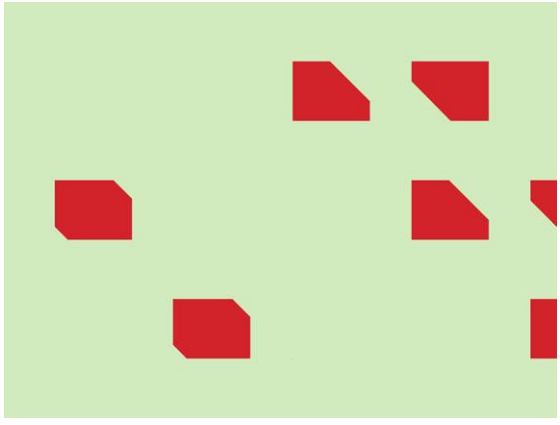


(j) Light passing through the filter (16%)

Light passing through the third filter

(j) Image (j) represents the theoretical amount of light that could pass through the third filter based on 100% blockage by the filter.

(k) Image (k) represents the amount of light (10% in this example) that would likely remain stable, and therefore remain visible. The smaller segments of light would not have the energy to maintain their stability, and thus would return back to being background aether.



(k) Collapse of minor light elements (10%)

Conclusions

- The physics observed here has **nothing** to do with the magical properties of light.
- The mechanics is based on a photon rebuilding its trimmed shock wave (at the speed of causality), but only along the sides where the shock wave was filtered.
- This means that the smaller the change in angle from one filter to the next, the greater the potential for the rebuilt shock wave to pass through the next filter, which means the photon has to do less work to rebuild its shock wave.

Glossary

Aether	The cloud of expanding quantum forces that make ‘empty’ space.
Attached quantum forces	Quantum forces that are attached to, and travel with, matter due to the binding actions of the quantum forces.
Big Bang	The assumed expansion of quantum forces that formed the universe, and which continues to the present day.
Concentrated quantum forces	Quantum forces that have a concentration greater than background levels (i.e. matter and virtual particles).
Critical velocity	The speed of causality of a fluid.
Double slit experiment	An experiment involving light passing through two narrow slits located in close proximity to each other.
Energy	Traditionally considered to be the primary product of the Big Bang. In this document the term can be interchanged with ‘quantum forces’.
Energy field	What is assumed to fill space. Equivalent to the terms ‘aether’ or a cloud of quantum forces. (I have avoided using the term ‘quantum force field’ for obvious reasons, and because the term ‘quantum’ means small, while the term ‘field’ is suppose to represent the vastness of space.)
Fluid mechanics	The study of fluids in motion.
Free quantum forces	Non-concentrated quantum forces that primarily fill space (i.e. the aether)
Mathematics	The **science** of numerical modelling, independent of whether the events is observed or imagined.
Mental exhaustion	The author’s current, and likely continued, mental status.
Photon	Considered to be the central core (element) of a unit of light
Physics	The study of objects in motion.
Qforce	An abbreviation of ‘quantum force’ that is used in this document to condense the size of some text boxes.
Quantum force	The assumed element that was the single product of the Big Bang, and which subsequently made the universe.
Shock wave	A wave formed when a fluid is disturbed by a force travelling at either the critical velocity, or a speed greater than the critical velocity of the fluid.
Speed of causality	The maximum rate a force or pressure can transfer through a fluid.
Time	The mechanism that generates time (e.g. universal time).
time	The action or progress of time (e.g. clock time).
Triple filter experiment	An experiment involving light passing through three polarised filter, each aligned in a different direction.
Virtual wave	A wave that appears to exist, but is only a visual ‘trick’, such as a series of flashing, but static, lights.
Wave	Movement that oscillates either transverse or longitudinally to the direction of travel, or movement that simulates wave motion, or images that describe wave motion.
Wave theory	The physics of wave motion.